

JANUARY 9, 1941

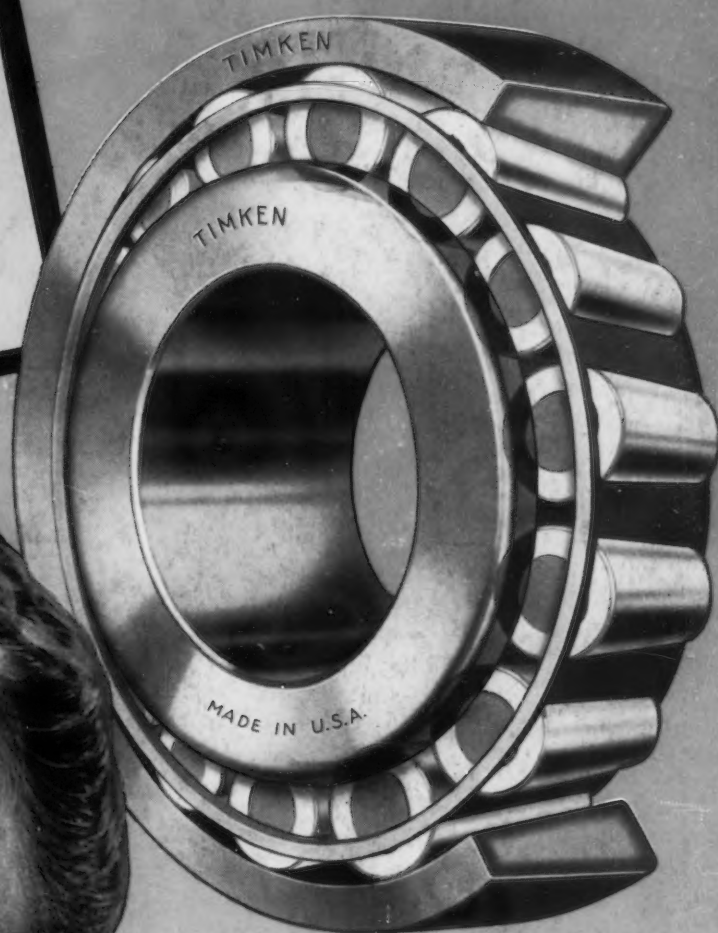
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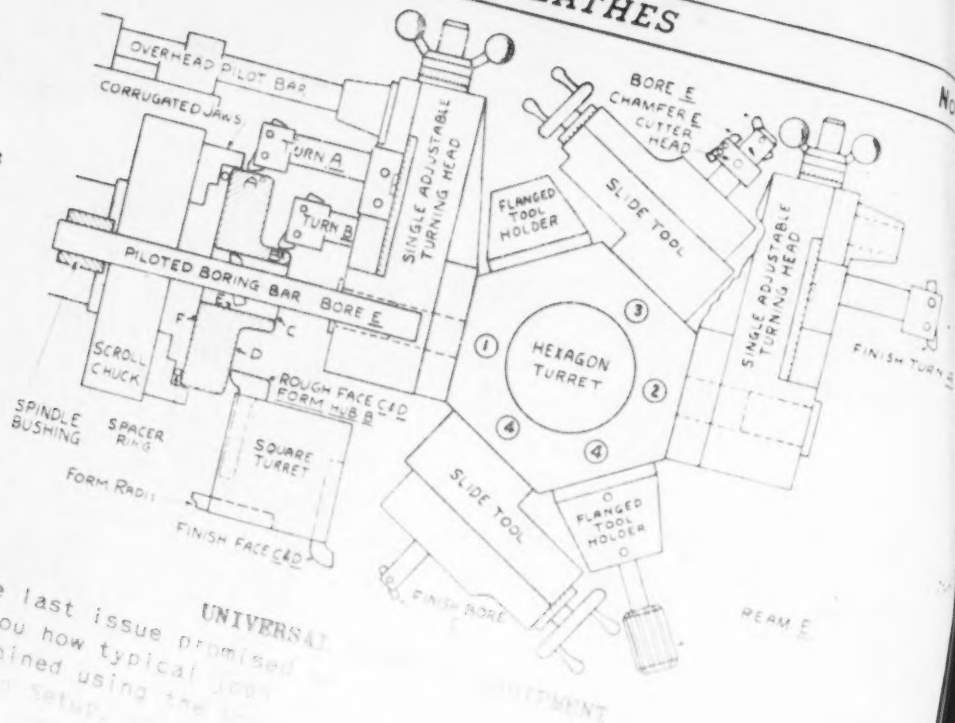
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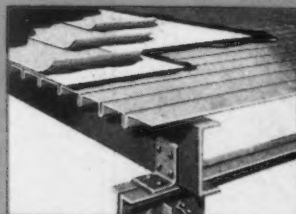
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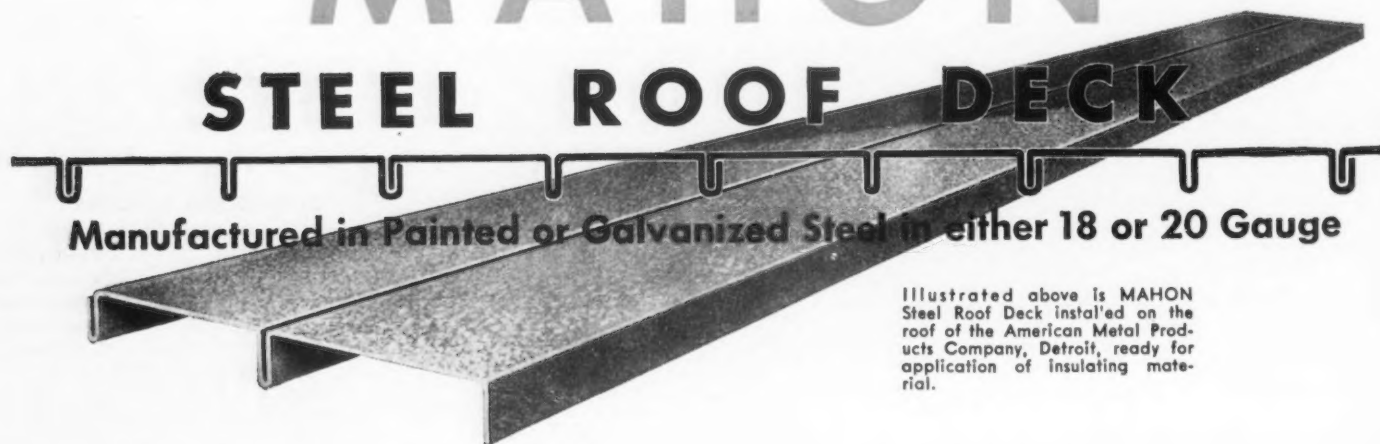
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The Iron Age

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JAN. 9, 1941

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1855



Soup First; Pie Last

MAYBE you have or maybe you haven't ever been in the kitchen of a great hotel where everything is cooked to order. And been in it at the rush hour when hungry and fastidious customers have filled the dining room.

Chefs in white caps stand before rows of ranges; assistants bend over choppers and mixers ready to go to work; waiters stream in from the dining room with the orders of the customers; everybody goes into action on a definite priority schedule and the feeding of the multitude begins.

Sometimes you would wonder how it was possible, in the space of an hour, to fill the varied demands ranging from the dyspeptic's crackers and milk to the gourmet's green terrapin, snails and duck à la presse.

Organization does it. Specifying does it. Seeing to it that each customer gets his desired items in the proper sequence. There is even time left to collect the tips.

Now just suppose that that room was full of hungry people all demanding everything at once. And that the waiters, in the confusion, were unable to take down the orders in proper sequence but rushed into the kitchen shouting food, food, more food! And that the chefs and their assistants started hectically to cook up everything that they could lay their hands on. Do you think that you could clear that dining room in an hour? And wouldn't the dyspeptic be likely to get the snails and the duck à la presse while the gourmet got the crackers and milk?

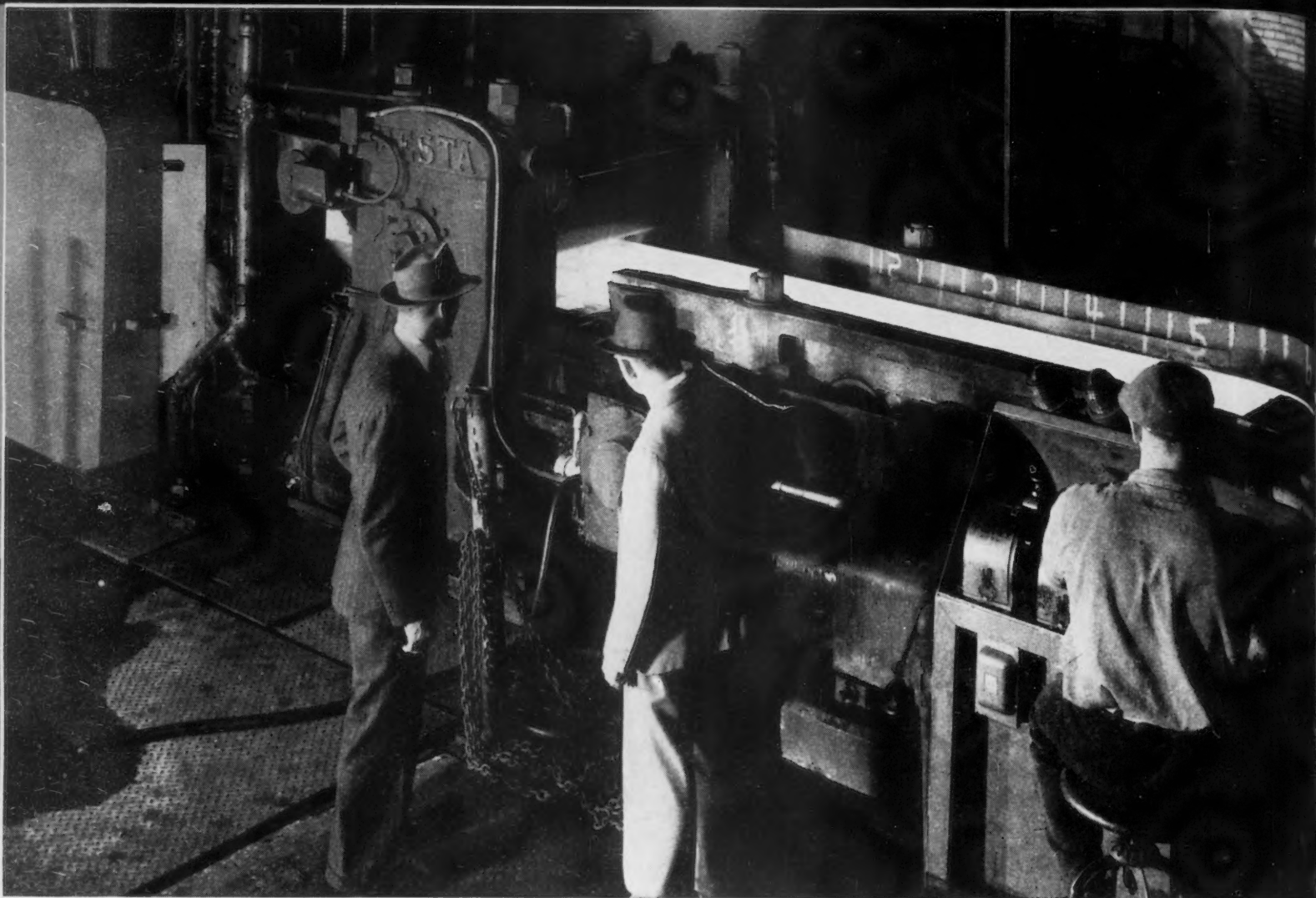
Just multiply this scene about a million times and you get a picture of our national defense program. And you may begin to get an understanding of why the customers are waiting for their orders to be filled.

Here, for example, are thousands of customers hungry for machine tools and calling for them immediately. Give us lathes! Give us milling machines! Give us boring mills! Give us drilling machines! Give us everything now! We're hungry for machine tools. And back in the big industrial kitchens, the chefs in the white hats frantically putting together batches of gears and pinions and shafts and castings and hoping against hope that the fellow who needs the soup won't get pie first instead.

You couldn't feed a hundred people that way without a log jam and you can't feed a defense program on that basis either. The waiters must have time to write out the orders. And somebody in the kitchen must have power to say whose soup comes first.

What we need is less shouting and more specifying. Usually it works out that less haste makes more speed.

J. H. H. H. H. H.



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How to Electrolytically

Polish Metals for

Metallographic Examination

By F. KELLER

*Metallurgical Division, Aluminum
Research Laboratories,
New Kensington, Pa.*

HERETOFORE, the preparation of specimens of metals for metallographic examination has involved the use of a highly developed technique and considerable skill. Recently, however, electrolytic methods have been developed which make the polishing of specimens a simple and routine task. These methods, in some instances, are capable of producing finishes which cannot be duplicated by the usual mechanical methods. Many metallographers have tried electrolytic polishing with more or less success. The results in general, have been encouraging; consequently, it is likely that satisfactory methods for different metals and alloys will be developed rapidly.

This type of finishing has some very decided advantages over mechanical polishing. It has, also, some disadvantages and limitations. The advantages are (1) large areas can be prepared for visual inspection, low power or high power examination; (2) per-

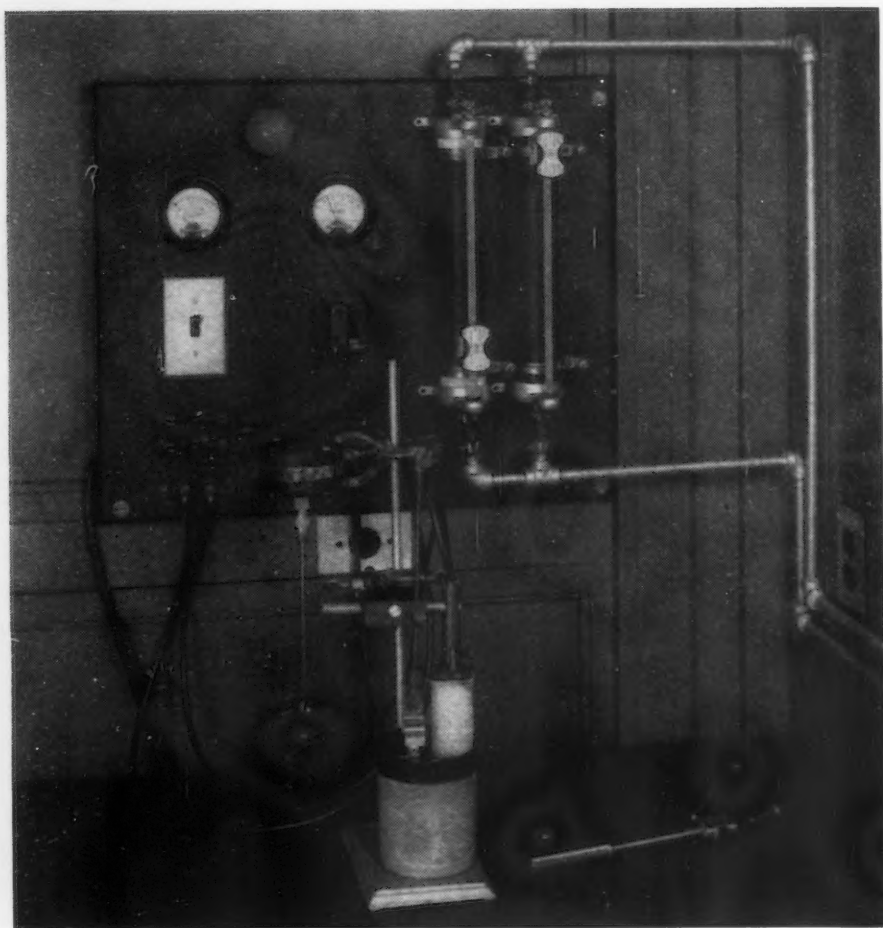
sonal skill is eliminated; (3) the polished surfaces are free from flowed metal and have uniform etching characteristics; (4) all scratches are removed; (5) final polishing can be done quickly and economically. The disadvantages are that this method does not work satisfactorily with heterogeneous alloys because some constituents are dissolved and others are left in relief, that different conditions are required for different alloys and tempers to obtain the best results, and that it is necessary to start with a smooth and uniformly active surface.

Electrolytic polishing produces a

smooth and brilliant surface because of selective removal of metal from the surface by anodic action. When metals dissolve anodically, a surface film is liable to form which affects the anodic process. If this film is non-conducting or discontinuous, exposed areas of original surface will dissolve rapidly because of the greatly increased current density. The factors which influence the type and amount of film are the type and strength of the electrolyte, the temperature, the solubility of dissolution products in the electrolyte and the polarization characteristics. As a consequence, the anodic process is dependent on the electrochemical properties of the metal being polished.

In brief, electrolytic polishing results from a selective dissolution of elevated material on a metal surface; it takes place only when the rate of solution of elevations is greater than that of depressions. Explanations for this type of polishing have been given by Jac-

For other articles on electrolytic polishing, see THE IRON AGE, issues of Dec. 21, 1939, p. 30; Jan. 11, 1940, p. 22; April 11, 1940; Dec. 26, 1940; etc.



quet,^(8, 20) Elmore,^(5, 6) and Pray and Faust.⁽²⁶⁾ These investigators contend that selective anodic dissolution depends on the formation of a conducting film which is thin on raised portions of the surface and thick on depressed portions. According to Pray and Faust, it is not known whether this film is an oxide, a layer of gas, a film of insoluble reaction product or a static liquid film highly concentrated in anodic products.

The electrolytic polishing of metals for metallographic examination was proposed by Jacquet about five years ago. He recommended the use of mixtures of perchloric acid, acetic anhydride and water and of orthophosphoric acid and water for various metals. Mehl and his associates⁽²⁵⁾ have investigated the methods suggested by Jacquet for preparing specimens of iron and steel and have obtained results that confirm the claims made for these methods. These investigators have published a comprehensive summary of the pertinent data regarding solutions and operating conditions required for polishing various metals. Merchant,⁽²⁰⁾ commenting on the above data, calls atten-

tion to the fact that perchloric reagents are very dangerous to handle and that mixtures of perchloric acid with any organic material are potential explosives. As a consequence, specimens of certain alloys and those mounted in bakelite, lucite or any organic material should not be polished in the solution which contains perchloric acid.

Electrolytic polishing produces the best results when the specimens are relatively pure metals or essentially solid solutions. Specimens of these types of materials are, as a general rule, the most difficult to polish by mechanical methods. Investigations of the polishing characteristics of the various commercial aluminum alloys have indicated also that the results depend upon the type of micro-constituents present. Some constituents are dissolved rapidly during the electrolytic polishing process; others are not dissolved at all. In heterogeneous alloys, therefore, some constituents may be dissolved out entirely; others may be left standing in relief. This prohibits, in some instances, the use of the electrolytic polishing methods for cast alloys which have a continuous network of constituents or for wrought al-

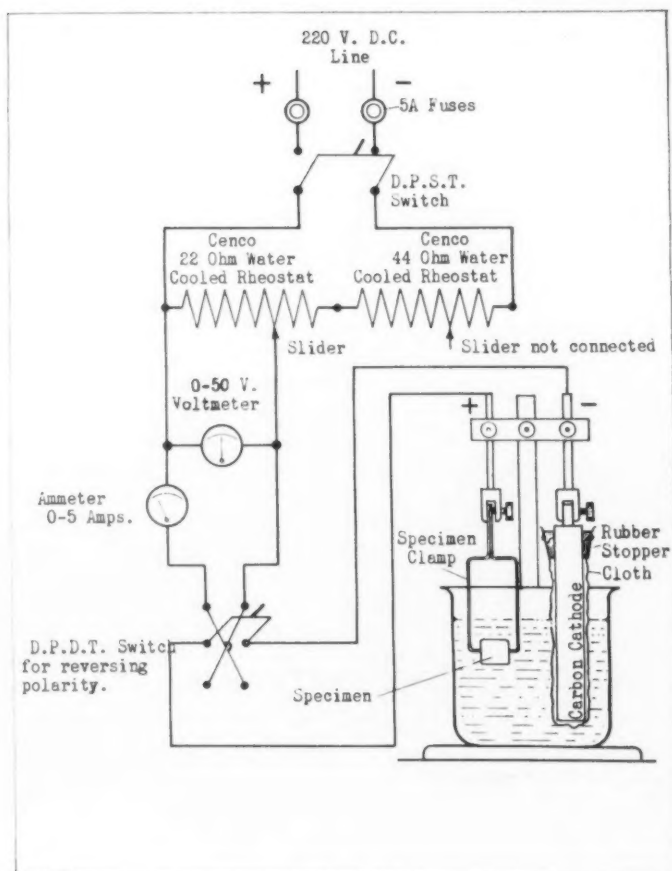
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Fig. 1—Arrangement used at the Aluminum Research Laboratories for electrolytic polishing of aluminum alloy specimens for metallographic examination.

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RIGHT

Fig. 2—Arrangement for electro-polishing metallographic specimens.



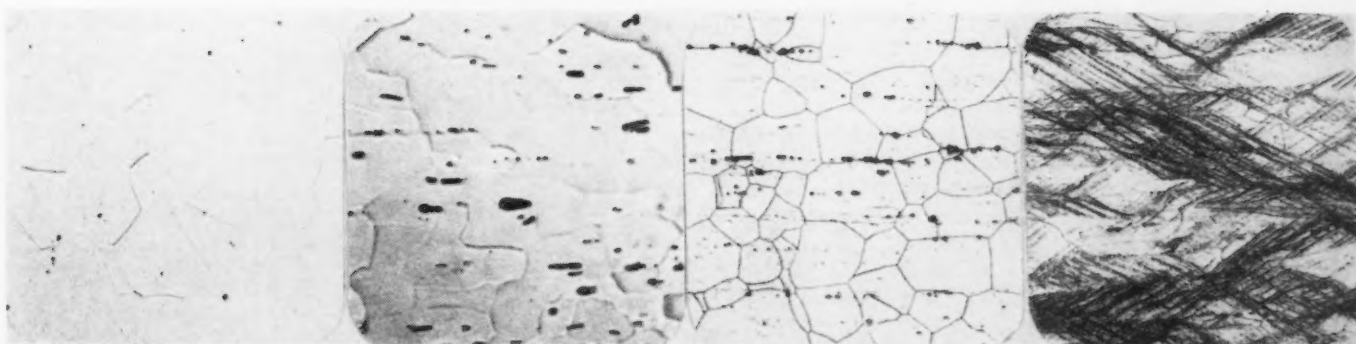


Fig. 3—Unetched microstructure of electro-polished 99.95 per cent aluminum sheet. At 100 diameters.

Fig. 4—Unetched microstructure of electro-polished 99.2 per cent aluminum (2S) sheet. At 500 diameters.

Fig. 5—Microstructure of electro-polished 10 per cent aluminum-magnesium alloy sheet in the heat treated temper. Shows solid solution structure. At 500 diameters.

Fig. 6—Microstructure of electro-polished 10 per cent aluminum-magnesium sheet. This sample was cold worked and aged; it shows precipitate along slip planes. At 500 diameters.

loys which contain certain constituents.

In order to obtain satisfactory finishes by means of electrolytic polishing, it is necessary to start with a specimen which has a plane surface. The initial preparation of specimens, therefore, involves the use of the usual metallographic polishing methods up to the semi-final or final polishing operation. Satisfactory electrolytic polishing, however, can be obtained on specimens which have been finished on 3/0 or 4/0 metallographic emery papers. The optimum electrolytic conditions will undoubtedly have to be worked out for different tempers and different alloys since, in many cases, the conditions necessary for successful finishing will vary. It is altogether possible, however, to produce a metallographic specimen with a clear polished matrix free

of all flowed metal without getting excessive relief or dissolution of the micro-constituents provided that the specimen has a reasonably good surface preparation before the electrolytic polishing operation. In general, it is advisable to accomplish the polishing by the removal of as little metal as possible.

Aluminum Research Laboratories have developed a procedure for the electrolytic polishing of aluminum alloy specimens. The arrangement used is illustrated by Figs. 1 and 2. This consists chiefly of a potentiometer and the instruments necessary to indicate voltage and current. The perchloric acid-acetic anhydride and water mixture recommended by Jacquet has been tried and will produce satisfactory metallographic finishes on high-purity aluminum and on some of the commercial aluminum alloys.

The solution, however, is somewhat inconvenient to prepare and the operating conditions are rather critical.

For quite a number of years, aluminum has been electrolytically brightened or polished in the commercial production of reflectors.^(1, 2, 23) This process has been used successfully for polishing aluminum alloy samples for metallographic examination. It involves the use of a solution of fluoboric acid (HBF_4) and water as the electrolyte.

The use of fluoboric acid for the anodic treatment of aluminum alloys is protected by patents owned by Aluminum Co. of America.

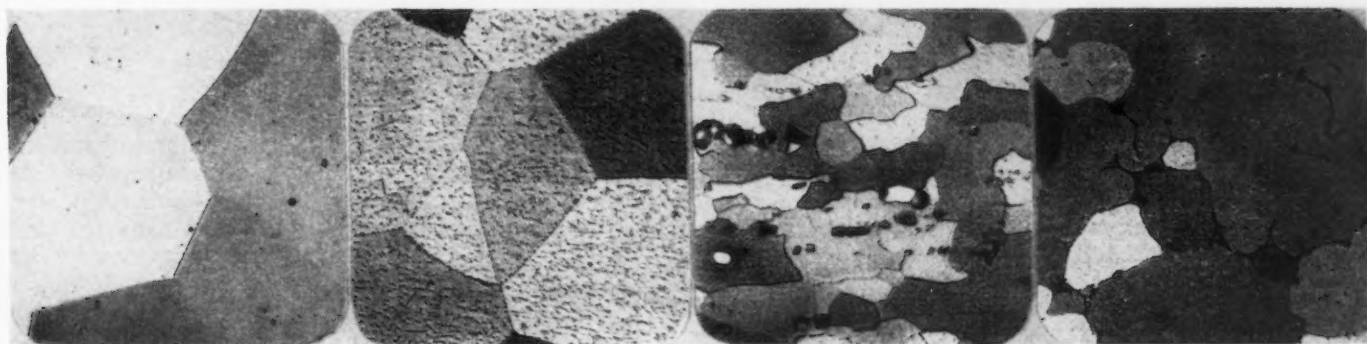
This solution is not expensive and is safe to handle. Furthermore, the

Fig. 7—Microstructure of electro-polished high purity 4 per cent aluminum-copper alloy. HF-HCl-HNO_3 etch. Shows solid solution structure of heat treated condition. At 500 diameters.

Fig. 8—Microstructure of electro-polished high purity aluminum-copper alloy in heat treated and artificially aged condition. HF-HCl-HNO_3 etch. Shows precipitate of CuAl_2 . At 500 diameters.

Fig. 9—Microstructure of electro-polished duralumin type alloy (17S) in the heat treated condition. HF-HCl-HNO_3 etch. At 500 diameters.

Fig. 10—Microstructure of electro-polished No. 195 casting alloy in the heat treated condition. HF-HCl-HNO_3 etch. At 500 diameters.



operating conditions are much less critical than with Jacquet's solution and, in general, good results have been obtained. Examples of the character of metallographic finishes obtained on aluminum alloy samples by electrolytic polishing in a fluoboric acid electrolyte are illustrated by Figs. 3 to 10 inclusive.

From the results obtained at the Aluminum Research Laboratories, it is felt that the use of electrolytic polishing for preparing specimens for metallographic examination offers some very interesting possibilities. Further developments in technique will undoubtedly result in improved methods for obtaining very satisfactory metallographic finishes, rapidly and consistently. It is altogether possible that some of the various electrolytic methods which are being developed to polish metals commercially can be adapted to polishing metallographic specimens.

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Metallography of Inclusions

A PRELIMINARY scheme of classification for inclusions in cast irons and pig irons has been developed by H. Morrogh and reported to the British Iron and Steel Institute. Using this classification, the various inclusions are dealt with under the appropriate headings. Also, various experiments have been performed and reported to elucidate the nature and mode of occurrence of these particles.

The effect of pouring temperature on the morphology of manganese sulphide is discussed. Both manganese and iron sulphide were found to behave as nuclei for the formation of temper carbon in malleable iron. Manganese sulphide gives "graphite-flake-aggregate"; temper carbon and iron sulphide gives spherulitic temper carbon.

A blue-pink inclusion has been observed by Mr. Morrogh in various cast irons containing titanium and insufficient manganese to neutralize all the sulphur as manganese sulphide. This constituent has been prepared in a number of melts and

shown to be probably titanium sulphide. Two forms of the titanium sulphide inclusion occur, one allotriomorphic and one idiomorphic. The complicated optical properties of this inclusion, as revealed by the metallurgical polarizing microscope, are described in detail.

The effects of test bar diameter and titanium content on the number of titanium carbide and titanium cyano-nitride crystals have been determined by means of inclusion counts. An attempt was made by Mr. Morrogh to determine whether the solubility of titanium carbide in austenite could be detected by the inclusion count method.

The effect of zirconium, in amounts up to about 0.5 per cent, on the inclusions in cast irons was studied. With increasing zirconium contents it was found that the manganese sulphide in the base iron was gradually replaced by an orange-yellow gray inclusion. When all the manganese sulphide had been removed from the structure,

blue-gray cubes of zirconium carbide appeared, which combined with the titanium carbide present to give a complex titanium-zirconium carbide. The optical properties of the orange-yellow to gray inclusion, as revealed by the polarizing microscope, are given in detail. In melts carried out in a rocking arc furnace, the yield of zirconium from ferro-silicon-zirconium additions was very poor and most of the zirconium appeared to be fixed as lemon-yellow zirconium nitride. An attempt to introduce this inclusion into crucible melted cast iron by bubbling nitrogen through the melt failed.

Very little analogy was found between the inclusions in steels and cast irons, according to Mr. Morrogh, the latter being characterized by the almost complete absence of visible oxides or silicates. In conclusion, it is suggested that the small particles referred to in the paper could be termed "minor phases" to great advantage with regard to definition.

Estimating Arc Welding Dimensions In Structural Design

By R. A. Gast
Mechanical Engineer, Lincoln
Electric Co., Cleveland

IN only a few arc welded structures is stress uniformly distributed at the joints, but in designing such structures it is customary to make the assumption that stress distribution is uniform in all ordinary cases. Any condition, however, that seriously interferes with this assumption must be given thoughtful consideration. This article deals with the general case and by two examples illustrates some of the principles involved in making design computations for arc welded joints.

Considering the simple case, shown in Fig. 1, of a bar or strap welded to a plate, let us assume that the bar is loaded in direct tension and that no bending or eccentric loading is placed on the beads, which are, therefore, stressed simply in shear. The load is known and the dimensions of the strap are known.

Let P = load

S = allowable stress in strap in lb., per sq. in.

t = thickness of strap, in.

b = width of strap, in.

Then, $P = Stb$

For arc welding, the structural code permits 13,600 lb. per sq. in. in

shear on throat area. The load value of a 1-in. fillet weld in longitudinal shear is 9600 lb. per lineal in. with shielded arc electrodes ($0.707 \times 13,600 = 9600$). With other types of electrodes, load values will be lower.

Two beads of equal length and size equal to strap thickness are used in Fig. 1. Hence the total bead capacity is $2t \times 9600$ lb. per lineal in. Since load equals Stb , the effective length of weld per side will be:

$$\frac{Stb}{2t \times 9600} \text{ or } \frac{Sb}{19,200}$$

As an example, let us assume that S equals 16,000 lb. per sq. in. unit stress.

$$\text{Then } \frac{16,000 b}{19,200} = 0.833 b$$

If the unit stress in the plate is expressed in Kips (1000 lb. per sq. in.), or K , then the formula for L , the effective length of bead per side, becomes:

$$L = \frac{bK}{19.2}$$

Values for L for different strap widths are given in Table I.

The same method can be used for estimating effective lengths of

beads for joining an angle to a plate as in Fig. 2, where the legs of the angle are equal. Again let us assume that the angle is loaded in simple tension. The load on the angle may be computed from the allowable unit stress and the cross-sectional area. If t equals thickness and a equals length of angle leg, then the area is approximately:

$$\begin{aligned} A &= t(a + a - t) \\ &= t(2a - t) \\ &= 2ta - t^2 \end{aligned}$$

Since the t^2 may be dropped and still retain an ample margin of safety, the area of the angle becomes simply $2ta$ and the load is, therefore, $2taS$, where S is the stress in lb. per sq. in. as in the first example. Assuming bead capacity at $t \times 9600$, total bead length may be calculated as follows:

$$\frac{2taS}{9600 t} = \frac{2aS}{9600}$$

In angle connections of the type shown in Fig. 2, it is customary to proportion the beads inversely as their distance from the center of gravity. Therefore, in proportioning the two beads, the shorter head, at toe of angle) will be one-third of the total bead length since

the distance from the center of gravity to the heel of the angle is approximately one-third of the length of the angle leg a . The shorter bead will then be

$$\frac{1}{3} \times \frac{2aS}{9600} = \frac{aS}{14,400} \text{ or } \frac{aK}{14.4}$$

Expressed as a general statement, multiply unit stress in angle in Kips by length of leg in inches and divide by 14.4 to obtain length of shorter bead in inches. The length of the longer bead is twice this value.

As an example, again assume that S equals 16,000 lb. per sq. in. unit stress. Then the shorter bead length will be:

$$\frac{16a}{14.4} = 1.11a$$

To take another example, the short bead of a 3-in. angle with 18,000 lb. per sq. in. unit stress, welded as in Fig. 2, would be:

$$\frac{18 \times 3}{14.4} = 3.75 \text{ in.}$$

The longer bead would be $2 \times 3.75 = 7.50 \text{ in.}$

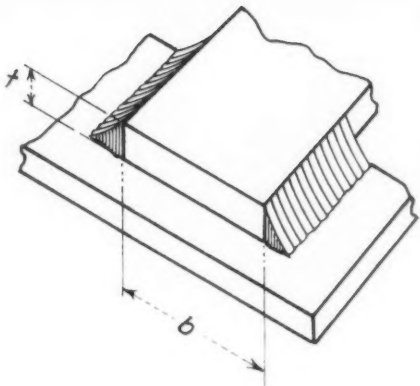


Fig. 1—Bar or strap arc welded to plate. Simple sketch used in calculating bead size.

Table I—Effective Length of Bead Each Side, Strap to Plate Connection

Plate Width (b) Inches	Values of (L)						
	Unit Stress in Plate, Kips (K)						
	8	10	12	14	16	18	20
1	.42	.52	.625	.73	.83	.94	1.04
2	.84	1.04	1.250	1.46	1.66	1.88	2.08
3	1.26	1.56	1.875	2.19	2.49	2.82	3.12
4	1.68	2.08	2.50	2.92	3.32	3.76	4.16
5	2.10	2.60	3.125	3.65	4.15	4.70	5.20
6	2.52	3.12	3.75	4.38	4.98	5.64	6.24

Table II—Approximate Length of Bead (Shorter), Equal Leg Angles

Size of Angle Inches	Unit Stress in Angle, Kips						
	Length of Bead, Inches						
	8	10	12	14	16	18	20
2 x 2	1.11	1.39	1.67	1.94	2.22	2.50	2.78
3 x 3	1.67	2.08	2.50	2.93	3.33	3.75	4.17
4 x 4	2.22	2.78	3.34	3.98	4.64	5.30	5.96

Table III—Short and Long Bead Lengths for Equal Leg Angles, at 20 Kips Unit Stress

Size of Angle Inches	Area Sq. In.	Distances Bead to Center of Gravity, In.		Load Area x 20 Kips	Lengh Beads	
		X ¹	X ²		*L ¹ —Load x X ²	L ² —Load x X ¹
					a x 9.6 x t	a x 9.6 x t
2 x 2 x 1/4	.94	1.41	.59	18.8	2.31	5.52
2 x 2 x 3/8	1.36	1.36	.64	27.2	2.45	5.13
2 1/2 x 2 1/2 x 1/4	1.19	1.78	.72	23.8	2.85	7.07
3 x 3 x 1/4	1.44	2.16	.84	28.8	3.37	8.65
3 x 3 x 3/8	2.11	2.11	.89	42.2	3.48	8.25
4 x 4 x 1/4	1.94	2.91	1.09	38.8	4.40	11.80
4 x 4 x 3/8	2.86	2.86	1.14	57.2	4.55	11.30
4 x 4 x 1/2	3.75	2.82	1.18	75.0	4.60	11.00

*It is usual to make this bead somewhat smaller in size than "t" and therefore longer than indicated above, because of shape of angle edge.

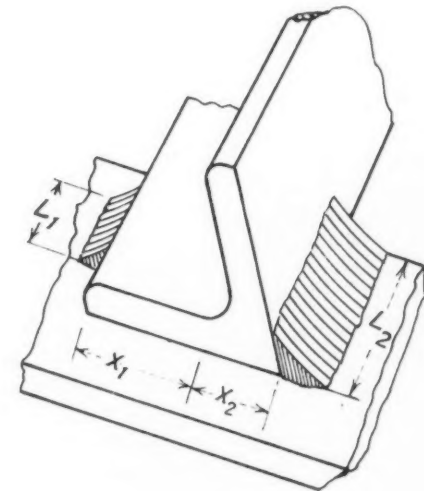


Fig. 2—Sketch showing angle, with legs of equal length, arc welded to plate. Values for the symbols are given in Table III.

Metal Finishing

—A description of recent developments
in electroplating, metal coloring, polishing
and organic finishing

ONE of the most encouraging aspects of the electroplating industry is the fact that steadily increasing attention is being devoted to the fundamentals of electrodeposition. The keen interest in the "whys" account for the rapid progress in the "hows" in a field that was once an art with only "recipes" and "formulae" to guide it, but is now truly a science.

The trend, therefore, is definitely in the direction of greater knowledge of fundamentals; better knowledge of basic metals; the preparation of metals; the effect of hydrogen occluded in the basis metals and absorbed during the process of electrodeposition; cold working of steel and its effect on the plate; grinding and polishing operations on the basis metal and their effect on the plate; variations in the crystal structure of the electrodeposits.

Studies have been made of current distribution, the effects of the container and the position of the anode and cathode on plated objects of various shapes, by C. Kasper,¹ who has also worked on the influence of anode size and shape.² The effects of pH on plating solutions were explored by Graham,³ who showed that in the absence of carbonates, most copper, silver, gold, zinc, brass and tin solutions were not buffered below a pH of 12; and in the presence of carbonates, a buffered level exists at about pH 10.3.

Anode corrosion is another phase of electroplating which is being carefully scrutinized. Pinner and Borchardt⁴ showed that the chlo-

ride content of nickel solutions influences the formation of loose nickel particles in solutions. Large quantities of particles form with nickel chloride content over 12 oz. per gal. Also, a larger number of loose particles occur in solutions operating at low current densities, around 5 amp. per sq. ft., than with high current densities, over 40 amp. per sq. ft.

° ° °

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° ° °

Electrolyte films are now becoming an object of study. According to Graham, Heiman and Read,⁵ new explanations are necessary for burned deposits, as the old theory, (that the high pH of the cathode film at high current densities induces precipitation of basic material on the cathode) is inadequate. The most important variation in nickel electrolytes seems to be the decrease in chloride at the cathode film, which seems to be much greater in extent than the decrease in nickel concentration. Decrease

in hydrogen concentration, although large, is small when expressed in pH units and consequently lies within the limits of ordinary plating bath operations.

In acid copper baths, the copper content has less effect upon the film than the acid content. An increase in temperature decreases the difference in concentration of the bath (acid and copper) between the main body of the electrolyte and the film. The composition of the film is relatively constant horizontally. The difference between the main body composition and the film composition increases with distance from the bottom of the cathode but at a decreasing rate, therefore approaching a constant difference.

The study of cathode films has been greatly facilitated by a very ingenious method developed at the National Bureau of Standards,⁶ which consists of rapidly freezing a layer of solution in contact with a hollow cylindrical cathode filled with dry ice, machining off successive layers of the frozen solution and analyzing them. (See Fig. 1.)

Diffusion is also being investigated. Burt-Gerrans⁷ has shown that in any electroplating bath, diffusion currents are always set up, the flow of the current being down

TWENTY-THIRD in a Series of Articles on the Technical
and Economic Aspects of Metal Cleaning and Finishing

from the anode where the electrolyte is richest in metal ions, and by the cathode where it is poorest. Convection layers persist in spite of strong agitation, which is valuable, nevertheless, although its effect is only to diminish these currents and allow the use of higher current densities.

Throwing power is a moot question, being insufficiently understood and certainly insufficiently controlled. In some instances, throwing power has been improved by the use of addition agents, one of the substances investigated for its effect in this regard being glycerin.⁸ The factors influencing the distribution of electrodeposited metals were investigated by Sacchi who developed a formula for computing throwing power.⁹ Gardam,¹⁰ in computing ratios equivalent to throwing power, found that copper cyanide gave the best distribution and chromium the poorest.

An interesting study was made of the complex cations in plating solutions, by F. C. Mathers. Many of the old theories of the operation of addition agents failed under experiment. Complex cations explain the presence, at least at the cathode surface, of a concentration of addition agent, acid radicals, etc. In many instances the chlorides in plating baths deposit at the cathode, but every metal constitutes a special case and no single addition agent will be effective in every solution.

It was found by Machu¹¹ that colloids and substances of high molecular weight are adsorbed at the cathode during deposition to form a "pincushion" appearing diaphragm. In this diaphragm, during the deposition of the metal, discharge of the cations occurs in the intermolecular spaces. The pores are small; consequently the crystal nuclei also are small and numerous, giving as a result a fine-grained deposit.

Hothersall¹² has worked on the adhesion of the electrodeposits to basis metals. The forces of adhesion are atomic in nature and the "anchorage" effect of rough or pitted surfaces accounts for only a small part of the adhesion. It was shown, with nickel as with copper, that the orientation of the structure of the basis metal is followed by the nickel deposit. Results were also given to show that weakness of the surface of the steel base, either intrinsic or produced by hydrogen,

can reduce adhesion to a very low value.

Another subject of importance which was given attention is the reflectivity of plated metals. Cinnamon¹³ determined the reflectivity of various electrodeposited metals to different wave lengths of light. Some of the relative reflectivities so found were: aluminum, 87; rhodium, 85.6; nickel, 79; chromium, 77.

In studying the basis metal and its effect upon subsequent coatings,

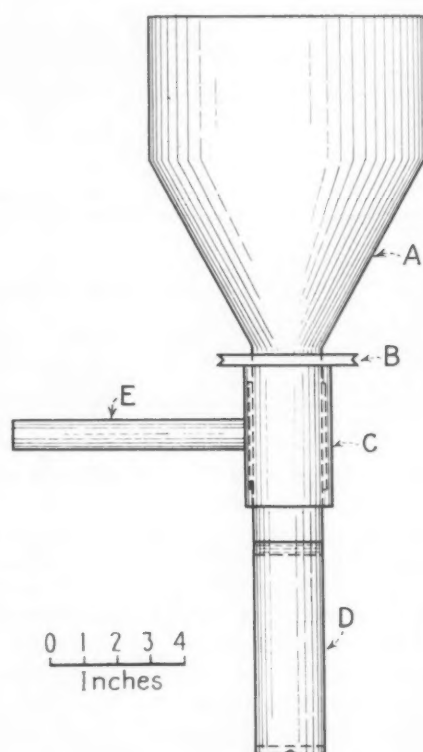


Fig. 1—Apparatus for freezing cathode film. A, funnel; B, pulley rigidly attached to the funnel; C, bronze bearing in which the stem of the funnel rotates; D, cylindrical cathode; E, rod for clamping apparatus to ring stand. Courtesy of American Electroplaters' Society.

considerable light has been thrown by investigating the presence of hydrogen in steel.¹⁴ The importance to electroplated products, of hydrogen absorption by steel has been demonstrated by experiment showing that lifting and blistering, and possibly poor adhesion, may be caused by the effusion of hydrogen from the steel base at ordinary temperatures, and much more so at higher temperatures. Hydrogen absorption has been shown to be considerable during cathodic clean-

ing of steel in either acid or alkaline solutions. (See Fig. 2.)

Steel has very low solubility for hydrogen at ordinary temperatures but very high ability to absorb huge quantities of hydrogen when present atomically at the surface during pickling and cathodic electrolysis. As a result, quantities of hydrogen escape from the steel when the atomic layer is removed by the presence of an applied coating or by the cessation of the hydrogen producing process. When the effusion occurs under a coating of any material, such as nickel which is not permeable to large quantities of the effusion, the coating may be lifted from the base, ruptured or blistered.

An interesting instrument was devised by Hull¹⁵ for the determination of current density ranges and the characteristics of the deposit, which should afford a positive check on the effects of addition agents or impurities upon deposits, with some assurance of proper solution operation. (See Fig. 3.)

An interesting example of the value of fundamental research to practical plating operations was shown in the application of X-rays to electroplated deposits,¹⁶ in which the X-rays were used to examine bright nickel deposits prepared by three processes. It was found that the solutions containing sulphonate additions gave extremely small grain size with the crystals mixed without any particular preferred direction. In the cobalt-nickel type, while the grain size was equally small, the grains were oriented in quite a definite direction, that is, with their cube faces parallel to the surface of the metal, as shown in some of the soft matte nickel deposits. This may explain why the cobalt-nickel deposit is more ductile than some of the deposits from solutions containing sulphonates.

Many of the basic problems of metal finishing are still unsolved; or perhaps it might be better said that as solutions appear, new requirements follow and consequently we again have new problems to solve. For example, we are still involved in the questions of the best processes for cleaning, descaling and rust-proofing of steel; removing mill scale and the effect of hydrogen occluded during the pickling process; whether it is best to remove this scale by friction, abrasion, chemical pickling or electrochemical descaling; whether to use hot galvanizing, Sherardizing,

zinc plating, cadmium plating, phosphate coatings, etc. Another fundamental, but also highly practical question as yet not fully answered concerns the mechanics of adhesion of the applied metal coat to the surface. Cleaning is still insufficiently understood. The effects of impurities in solutions are still unpredictable.

Basis Metal

The treatment of basis metals before plating and finishing is receiving more and more attention. Hothersall¹⁷ has described the effects of various treatments of the basis metals on the porosity of nickel coatings. That roughness of the surface is conducive to porosity in metallic coatings was found by Schloetter and Schellenmeier.¹⁸ Phillips¹⁹ work confirmed their findings, showing that the corrosion resistance of coatings deposited on steel was sharply affected by the type of polishing on the steel before coating. Thus, for example, grinding through the surface of cold rolled steel discloses pits, bores and possibly non-metallic inclusions; it also results in scratches and other imperfections which are harmful to the corrosion resistance of the plate subsequently applied. Moreover, scratch depth is not the only element involved as some relation may exist between corrosion resistance of the plate, the scratch width and the crystal structure of the deposited metal over these scratches.

In general, it is becoming more and more widely accepted that the condition of the base metal is of utmost importance to the quality of the deposit. As a consequence, considerable improvement has been effected by the mills in the surface finish of steel sheet and strip used for plating.

Electrolytic Polishing

Perhaps the most interesting recent development in the surface treatment of metals is "electrolytic polishing."²⁰ the anodic treatment of a metal in a specified solution which produces a bright lustrous finish without grinding or polishing. This process is now in full commercial operation on stainless steel, for which proprietary methods have been developed by Allegheny Ludlum Steel Corp., Rustless Iron & Steel Corp., Battelle Memorial Institute, Lucius Pitkin, Inc., and others. Recommendations have also been made for electrolytic polishing of non-

ferrous metals,²¹ nickel, Monel metal, aluminum, copper and brass, nickel silver, and ordinary carbon steel.

Many articles are so shaped that customary mechanical polishing operations are very difficult and sometimes impossible of satisfactory accomplishment. Electropolishing, with its ability to get into

enclosed metal finisher. After electropolishing, the work needs only to be rinsed and it is ready for the next plating operation. If the plate is not bright, it can be electropolished without being removed from the rack and is ready for the next operation. The "headaches" due to imperfect removal of polishing compounds are eliminated.

Cleaning

Improvements in solvent cleaning and degreasing have been effected mainly by combination of spray, immersion and vapor, in sequences suitable for the special types of work involved. "Emulsion degreasing" is attracting attention. Wetting agents are being increasingly used in alkaline cleaners.

Silicate cleaners are making steady and consistent headway according to Drake.²² The most generally used types are the orthosilicate, sesquisilicate and metasilicate, which have good detergent qualities and are steadily finding more applications.

A new material is available, tetrasodium pyrophosphate, whose normal pH in a 1 per cent solution is 10.2. It is said to be a good water softener with excellent properties of inorganic soil suspending and emulsifying.

That cleaning techniques have a direct bearing on the adhesion of electrodeposits is well known. This is nowhere more evident than in the work on zinc base die castings where "overcleaning" with strong alkalis has been found detrimental to adhesion. Some difference of opinion still exists about the comparative effectiveness of anodic and cathodic treatment. Cathodic cleaning is said to be more conducive to hydrogen absorption than anodic, but is still widely and successfully practiced in many types of work. Anodic cleaning of cold rolled steel to remove smut is increasing rapidly.

Much work is still to be done in the evaluation of cleaning materials and metal cleaning compositions, whose efficiency is still subject to check only by performance tests. Work is being done on this problem by Section G of Committee D-12 of the American Society for Testing Materials on Soaps and Other Detergents.

Handling Plating Solutions

Since the advent of bright plating the purification of solutions is now recognized to be a subject of



Fig. 2—Gas pits in coating on specimen cathodically cleaned in an alkaline bath. (Left) front. (Right) side, showing preferential location of pits. Courtesy American Electroplaters' Society.

o o o

corners, crevices and recesses of intricate shapes, is oftentimes the perfect answer to such problems. Electropolishing as part of electroplating procedure, both for base metal and plated surfaces, has many highly efficient applications. The ability to perform multiple polishing and plating operations, with the work on the same rack from start to finish, offers advantages plainly evident to the experi-

real importance. Hull²³ has described a method of removing sodium carbonate from cyanide solutions by the use of gypsum, and has also described the effect of carbonates and sulphonates on the viscosity and resistance of cyanide plating solutions.²⁴ Metallic and organic impurities are being watched closely. Four methods are available for eliminating them, according to Mattacotti²⁵: (1) the Liscomb method; (2) plating out; (3) hydrogen peroxide, and (4) activated carbon and filtration. Activated carbon is making notable

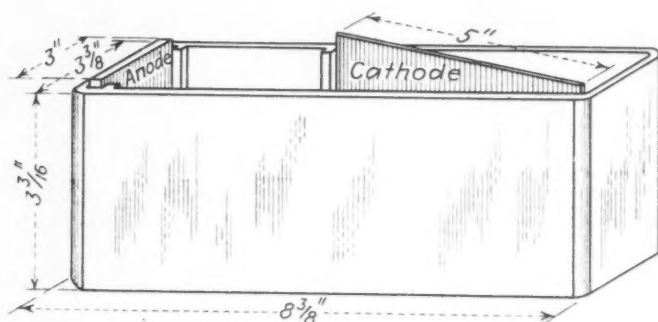


Fig. 3—Hull plating test cell for determining current density ranges. Courtesy American Electroplaters' Society.

advances for use in treating solutions, removing organic impurities, etc., according to Helbig.²⁶

Filtration has been greatly helped by the use of higher pump pressures and "filter aids," infusional earths, to increase the speed of filtration. According to Wynne-Williams,²⁷ filtration of the electrolyte is a necessary auxiliary to modern electroplating processes, but the filtration plant is of little value unless it is effective in removing the finest particles. Electrolytes are good solvents and the filtration plant may increase the rate of contamination by soluble impurities unless provision is made for frequent removal of the sludge. Occasional analyses of the sludge may provide information by giving warning of impending trouble.

Organic constituents can be removed not only by filtration with activated carbon but also by oxidation with permanganate, according to Weisberg.²⁸

An important element in plating practice is the heating of solutions. The old methods of heating by steam, gas or other means, are open to numerous objections. The electric immersion heater overcame a number of these objections, but, of course, the cost of current is appreciable. A comparatively young development consists of circulating

the solutions through an outside heat exchanger, in which the solution is brought up to the desired temperature and then returned to the tank. Some of the advantages of this practice are; uniform temperatures throughout the entire body of the solution; increased heating efficiency, since the efficiency in the heat exchanger is about twice that of the same heating area in the form of coils; the use of higher current densities with gentle flow of solution through the work tank, which reduces the plating time.

One of the subjects now receiving increased attention is the agitation of solutions for the purpose of improving current distribution. Agitation may be effected by mechanical stirring, circulation of the solution, compressed air or the movement of the cathode. The trend at this time seems to be toward the last named, in combination with circulation of the solution.

The effect of cathode motion on the plate is definitely helpful, and with high concentration of acid, allows the use of high current densities, thus increasing the rapidity of electrodeposition. Cathode motion seems to be preferred as air agitation produces bubbles which interfere with the current distribution, and stirs up the sludge, dirt, etc., in the tank, causing roughness of deposit. Also, the oil from the air lines contaminates the bath.²⁹

Another noteworthy tendency in plating is the recent increase in the use of wetting agents in cleaning and plating solutions. The object of the wetting agent³⁰ is to reduce the surface tension of the water from, roughly, 72 dynes per sq. cm. to 35, to facilitate wetting of the cathode. It has been found that some wetting agents act also as addition agents in a plating solution, tending to produce bright de-

posits. They may also have other effects on the bath, being, in general, complex organic compounds.

That many of the troubles in the plating room have been caused by water has long been suspected, but little close investigation has been made to confirm these suspicions. One discussion along these lines is of interest.³¹ Roughness, pitting and porosity of nickel deposits may be due to "hardness" and soap troubles. Tank corrosion and excessive anode polarization may result from chlorination of the water. The hardness of the water is traceable to calcium and magnesium salts. Specifications of purity for chemicals lose their value when the water used to make the plating solution or carried in by the "drag-in," offsets these purities. For example, a chemical can be specified free from chlorides and yet be mixed with chlorinated water; also a material may be bought with a maximum sulphate content and then mixed with hard water high in calcium sulphate. The importance of these constituents will be made clear by the fact that a nickel solution of the Watts composition contains over 85 per cent water and a Rochelle salt cyanide composition contains almost 89 per cent water.

Losses, due to drag-out, are now being given serious consideration as it has been found that in some instances very appreciable quantities of metals and chemicals are lost in this fashion. Among the recovery methods are (1) spray rinses and (2) the return of rinse waters to head storage tanks for re-use with the addition of the necessary quantities of salts and chemicals.

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Ed. Note:—Next week the author continues this discussion of recent developments by giving data on nickel, copper, zinc, silver, and alloy plating.

High Level Illumination Aids Steel Inspection

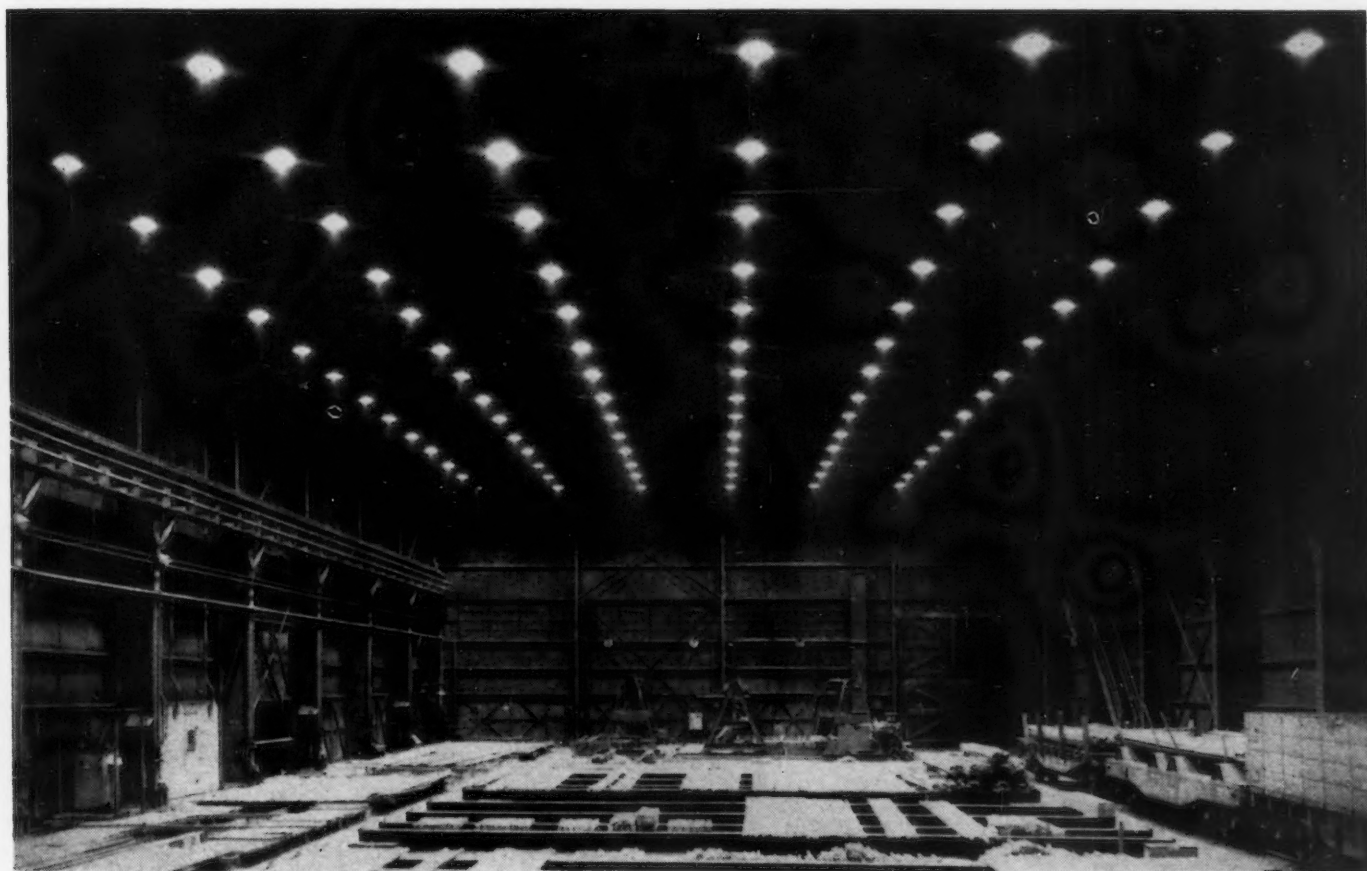
ENABLING night-time inspection of steel billets to be carried on for the first time, 96 Westinghouse "millites" installed in the chipping room of a large mid-western steel mill (see accompanying photo) have raised the seeing level in that area from 10 to 60 footcandles.

Good seeing is essential to proper billet inspection for they are examined

visually by trained inspectors. The outer crusted surface of the steel is chipped off, exposing the raw inner metal to the eyes of these men whose job it is to detect flaws in the metal structure.

Open type luminaires used in this billet chipping room were continually handicapped by dirt and grime collecting on their reflectors, reducing light

output to such a degree that chipping and inspecting could not be carried on at night. The Westinghouse "millites" were installed to replace the open-type units. These are enclosed units, with clear glass lenses, and are dust-tight. Installed at 12x12 ft. spacings, and mounted 40 ft. above the floor of the room, each unit uses a 1000 watt incandescent lamp.



Machining British Shells In Canada

ALTHOUGH British shells differ somewhat in design from American shells, the sequence of machine operations is much the same. A review of present machine practice as carried on in Canadian plants should therefore be of help to American manufacturers who are faced with the problem of tooling up for shell production. Canadian practice is summarized in the operation sheet, Fig. 1 on opposite page.

The main difference between the British and the American shell lies in the method of attaching the reinforcing plate at the base of the shell. In the former, operation 8,

the plate is set in a recess, the lip of which is peened over, whereas in American shells the plate is attached by a resistance welding process. This design somewhat simplifies the machining operations on the latter.

Another variation in machining practice depends upon whether the forging is made by the pierce and draw method or in an upset forging machine. In the former case British practice is to turn an irregular contour on the nose end of the shell in the rough turning operations (2) so as to reduce the amount of stock to be removed from the inside of the shell after

the nosing operation. In the latter case, a taper is formed in the nose end of the cavity during the forging process. This taper accomplishes the same purpose and at the same time simplifies the rough turning. American practice, on the other hand, is to rough turn the shell to a cylindrical form regardless of the type of forging, except on the larger sizes of shell. This procedure simplifies the rough turning but means that a greater amount of stock must be removed from the cavity in a subsequent operation.

Still another difference between the American and the British shell

(BELOW)
Fig. 2—Carbide tipped tool for rough or finish turning shell

(AT RIGHT)
Fig. 3—Carbide tipped tool for facing base end of shell

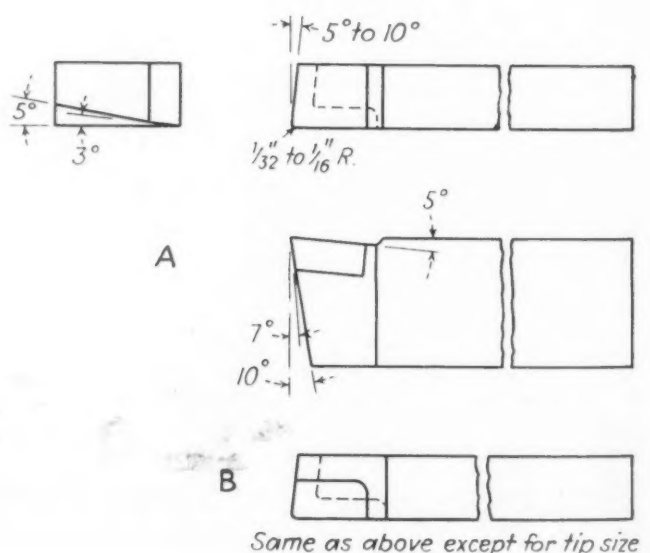
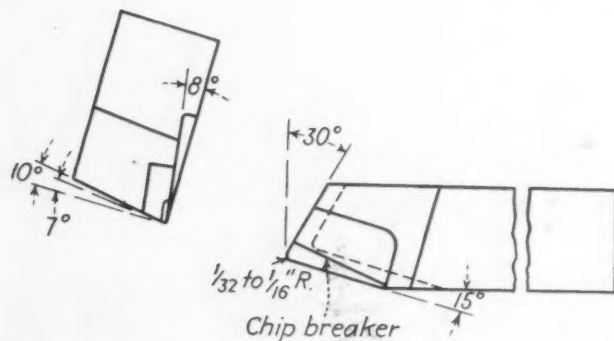
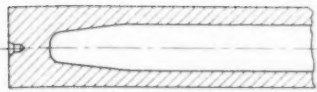
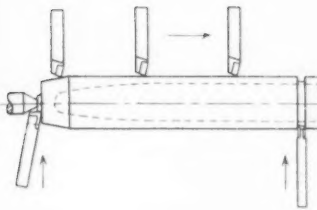
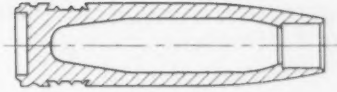


Fig. 1—Operation sheet for British shell production



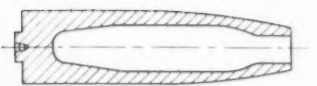
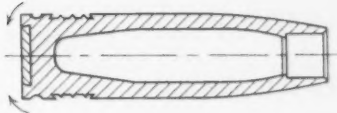
1—Center
Special machine

7—Turn band groove,
wave and dovetail
Hepburn* special ma-
chine
H.S.S. tools



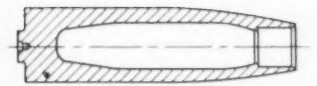
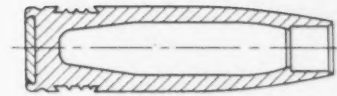
2—Rough turn, cut-off
and face base
Fay, Lo-Swing and
Hepburn* automatic
lathes
Carbide tools used
generally

8—Rivet in base plate
Hand tool



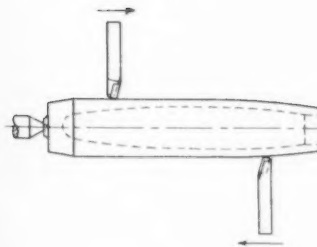
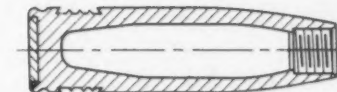
3—Nose in or bottle
Hydraulic press
Nose heated in spe-
cial furnace

9—Face base and form
radius
Hepburn* special ma-
chine
Carbide tools



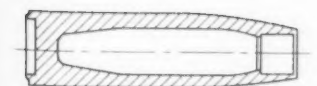
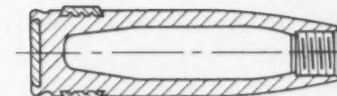
4—Bore nose end
Nateo multiple spin-
dle machine
High speed steel
tools, with carbide
tool in special head
for blending cavity
and bore

10—Mill thread in nose
Special machines
H.S.S. cutters



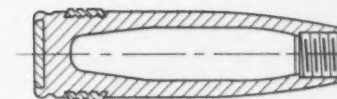
5—Finish turn
LeBlond lathe
Two carbide tools

11—Apply band to seat
West tire setter



6—Machine base plate
recess
Hepburn* special ma-
chine
Single point H.S.S.
tools

12—Turn copper band
Special lathe
H.S.S. form tool



* John T. Hepburn Co., Ltd., Toronto.

is in the design of the band seat. The American shell has a knurled surface whereas the British shell has three sharp ridges of sinuous or wave form in the bottom of the groove and extending circumferentially around the shell.

A feature of shell forged in an upsetter is that the open end of the shell is closely held as to length, leaving but a relatively small amount of stock which can be faced off, instead of making it necessary to employ a cut-off tool in the rough turning set-up as is the case when the pierce and draw method of forging is used. A carbide cut-off tool is quite satisfactory, but usually does not have as long a life as a simple carbide facing tool used on upset forgings. On some machines the life of the cut-off tool can often be improved by stopping the tool 1/64 to 1/32 in. away from the axis of the shell. The excess material can then readily be removed by knocking it off with a hammer after the shell has been taken out of the lathe.

Tool Design

Tools for turning shell can readily be made from standard carbide tools except for large shells where

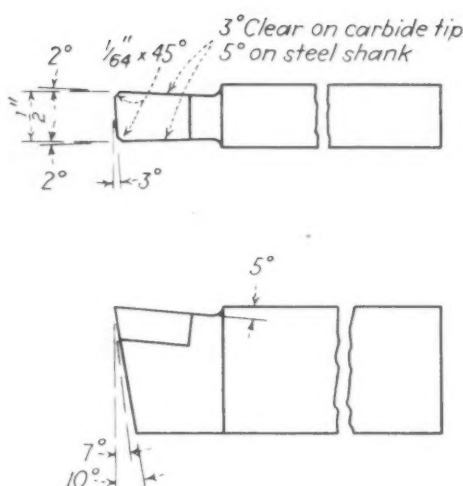


Fig. 4—Carbide tipped tool for cutting off open end of shell.

the cuts are extremely heavy or the forgings are markedly eccentric. For these conditions, the tools require carbide tips 25 to 50 per cent thicker than are used on standard tools.

For both rough and finish turning the carbide tool design shown in Fig. 2 is suitable. This tool is an adaptation of a Carboloy style 13 standard tool.

For facing the base end, the tool

designs shown in Fig. 3 are applicable. Tool A can be made from a Carboloy style 1 standard tool, while tool B is special, but may be more economical to use when only a small amount of stock is to be removed from the base end.

In Fig. 4 is shown a cut-off tool for shell forgings produced by the pierce and draw method. This tool would be employed on operation 2. For an upset forging where only a small amount of stock need be removed from the open end a facing tool of the opposite hand to tool B shown in Fig. 3 is suitable.

Recommended speeds and feeds for shell turning with carbide tipped tools are listed in the following table:

Operation	Speed Ft. per Min.	Feed In. per Rev.
Rough turn	250-300	0.020-0.025
Roughface base end	250-300	0.007-0.012
Cutoff	250-300	0.007-0.012
Finish turn	300-350	0.015-0.025

To obtain the maximum tool life, a heavy flow of coolant should be used on both the rough turning and finish turning operations. A soluble oil emulsion has been found to be the most satisfactory coolant for use with carbide tools when cutting steel.

A New Free Machining Alloy

AN addition to the group of high nickel alloys, designated as KR Monel, has been announced by the International Nickel Co., Inc. It is said to have high strength, can be fabricated in automatic screw machinery, resists corrosion, and can be heat treated

after fabrication to provide an extra measure of strength and hardness. The alloy is being produced in rod and wire forms only.

KR Monel represents the culmination of a development to make available a metal which would offer machining characteristics together

with physical properties similar to K Monel. Like K Monel, KR Monel is non-magnetic, thus also fitting it for service in the airplane and other industries, where resistance to magnetic influences is important.

Being a non-ferrous alloy with the same composition as K Monel and Monel, the new alloy provides the characteristic corrosion resistance of these materials. It derives its free machining qualities from special thermal treatment at the mill before shipment to the user. The properties of KR Monel rods are as given at left.

Properties of KR Monel Rods

	Yield Strength, 1000 Lb. Per Sq. In.	Tensile Strength, 1000 Lb. Per Sq. In.	Elongation, Per Cent In 2 In.	Brinell Hardness, 3000 Kg.
Hot rolled	40-85	90-120	45-30	140-225
Hot rolled, age hardened	90-120	135-160	30-20	260-300
Cold drawn	70-100	100-125	35-15	175-250
Cold drawn, age hardened	100-130	140-170	30-15	260-320

Die Design

—What are the more important types of dies used and the performance of each? What types of steels and heat treatments are used? These questions are answered by the author herein

By WARD G. KIFER

Timken Roller Bearing Co., Canton, Ohio

NUMEROUS books have been written on die design and have proved a great help to the majority of die designers and to the stamping trade in general. However, a large proportion of die engineering is done largely by trial and error. In the last ten years industry has no doubt seen the greatest stride in die development. Better presses have been designed and drawing steels have been improved, as well as steel for drawing and cutting dies. Use has been found for pressed metals in the household, the office, transportation, farming and building construction.

Comparatively few young men have, in the last ten years, availed themselves of the proper training to qualify them as "die designers." This is true of the die making industry as well. It takes from four to six years to train a die maker if he is a favorable prospect to begin with. Die making could be classed as a mechanical art. The same is true of a die designer. He can only get the basic ideas of die design from a book; the rest must

come from knowledge acquired from actual experience. There is no other trade where the die designer and the die maker should cooperate as closely.

There are very few press shops that use the same design dies as well as cutting clearances for shear dies. There is a wide variety of press dies. Different titles are given dies in various shops. The following are a few of the most common dies used with a brief description of the performance of each.

Plain blanking dies are of the cutting type and shear simple, flat blanks from the sheet.

Follow or progressive dies have two shearing or cutting members as in the manufacture of washers. The first member cuts the hole and the second cuts out the washer as the sheet is fed through the die, thus requiring two strokes of the press to complete one washer.

Compound dies are constructed in such a manner as to do the same work as a follow or progressive die. They have a punch and die in both upper and lower unit. The work produced from a compound die is more accurate than from a follow or progressive die and requires but one stroke.

Perforating dies are a set of punches and dies of the shearing type producing a number of holes at one stroke.

Embossing dies are generally of the female type, and, as pressure is applied letters and designs are raised on the surface of work.

Plain drawing dies shape a flat blank by deformation; in other words, flowing or bending the metal into a desired shape such as a cup.

Redrawing dies must be used after the plain drawing to increase the depth. It is impractical to draw to a depth exceeding the diameter of the shell in one draw.

Forming dies are used to shape a blank without drawing.

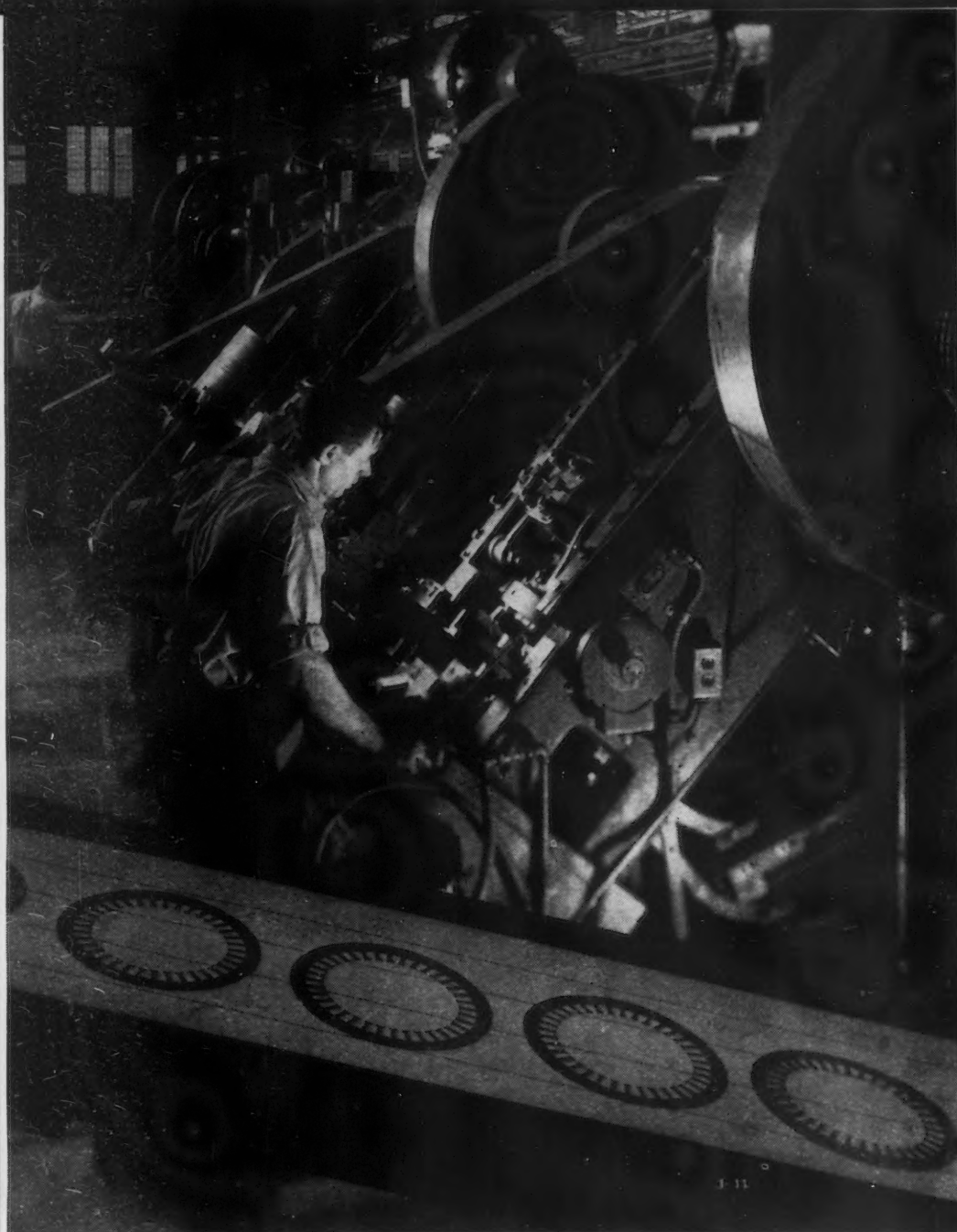
Combination dies combine two operations in one—blanking and drawing or forming.

Double action dies are a combination die having two slides.

Triple action dies are combination dies having three slides and may combine three operations, such as blanking, drawing and embossing.

Bending dies do simple bending of sheet metal or wire.

Curling or wiring dies are used to



form the beads on the top of drawn cylindrical parts.

Shaving dies are of the cutting type and are used to trim the torn edges of very thick blanks.

Before designing a die for a certain product numerous important points should be considered. First, the product or part should be studied to ascertain whether the parts to be made would require an intricate die or whether the part may be revised to simplify the die without changing the desired effect or changing the function of the part intended by its designer. It is often the case that, if the parts or product designer cooperates with the die designer, a less expensive die may be designed. Good die design must be approached not only from the standpoint of possibility but from that of practicability. Most any metal part can be produced by stamping and

forming, but the cost of producing may be prohibitive.

The required production of the part in mind should be considered. This sometimes is a deciding factor in the type of die built. Should the part be of an intricate design and the production warrant it, the number of operations may be confined to one. Should the production of the part in mind be small, it is sometimes less costly to make several simpler dies to produce the part. This, however, increases the labor cost of the part produced, but the cost will still be less than that of making a costly die to produce in one operation. Many short cuts can be made in dies where the production is small and presses are available to set in dies. The die maker should be freely consulted on every detail of design. Many dies designed on paper cannot be made by the die maker. Many

costly changes have to be made simply because of lack of cooperation.

Should a part be of such design that it cannot be made without machining, care should be taken that the least machining be done. This may be taken care of in calculating or developing the blank size. The clearance between punch and die, if edge of parts to be drawn or formed does not have to be exactly straight, should be at least 15 per cent of metal thickness. On $\frac{1}{4}$ in. sheet as much as 0.050 in. on the diameter may be used and will cause less galling and chipping on cutting edge and outside diameter of drawing and shearing punch.

Should the die be of a drawing nature there cannot be too much attention paid to the drawing radius. This radius should be made as large as possible, keeping in mind that an excessive radius may cause wrinkles and once these wrinkles form in the drawn shell they will not come out. The die maker should be instructed to produce as near a true radius as possible and polish to a mirror finish. Should trouble be experienced in drawing, such as scratches, it is a good policy to polish radii in the direction of the draw. In fact, the entire drawing surface should be polished in this manner if possible. A general rule, holding for a sheet $\frac{1}{4}$ in. or under, states that depth of first draw should never exceed the diameter of the shell, or one-third the diameter of the blank. If there is to be a top flange, this depth must be decreased.

If the shell is of a tapered design and it is desired to iron the side walls straight, it must be remembered that the angle of the draw punch and the angle of the mating member, sometimes called the core, must be calculated to take care of the thickening or stock crowding of the steel. This thickening of the metal at the open end of the shell is caused by the large diameter of the blank being drawn to a smaller diameter.

For extreme accuracy and close finish of a shell with a straight wall it is possible to iron the metal between the sides of the mating dies. The extent to which the shell can be ironed in one draw is 0.002 to 0.004 in. per side, and for the best finish, not over 0.001 in. If more than 0.004 in. is attempted, scratching and galling in both mating dies are likely to develop.

Should cracking occur on bottom radius of the shell, this can be overcome to some extent by increasing the inner draw radius. The inner draw radius sometimes is governed by the

texture or ductility of the sheet steel used.

In case it is necessary to punch a hole in the bottom of a shell as in a combination die, this should be done as near the finish of the draw as possible to keep the hole from stretching. Should the hole or internal punch shear the hole before the draw is completed, invariably the hole will be drawn large. If the hole is to be held to a close tolerance, the punch should be made 0.002 to 0.003 in. larger than size desired.

The pressure required for drawing can only be determined by trial. Too much pressure on the drawing may cause cracking on bottom radius of the shell. Insufficient pressure will cause wrinkles.

Many times after a neat job of die designing has been completed, its art is marred by the selection of the wrong type of die steel. The die expense averages about 5 per cent steel and 95 per cent labor, and for this reason premature die failures are costly and usually cause serious production delays.

Today it is not so easy to blame such failures on the heat treatment; for the old hit-and-miss "draw to a straw color" has given way to up-to-

date instrument-controlled heat treating departments.

There is a great variety of die and tool steels available and the selection of the proper type should be made very carefully. One of the new and improved die steels now being widely used is called Graphitic Steel. Graphitic Steel was developed in the plant of the Timken Roller Bearing Co., Canton, Ohio, and has now replaced all other types of steel used for punches and dies in that plant. The three present grades all contain 1.50 per cent total carbon, with varying amounts of silicon and other alloys. These steels can be readily forged to shape from the "as rolled" condition, but before machining to shape must always be normalized and annealed. This precipitates part of the total carbon in the form of free graphite, uniformly distributed throughout the steel, and develops the sphereodized pearlitic structure so well suited to good machining. Quenching develops a martensitic structure, the steel reacting in much the same manner as eutectoid tool steel. The resulting punches and dies show remarkable hardness and toughness, and are highly resistant to wear.

For water-hardening uses, no molybdenum is added, this type of graphitic

steel being known as Graph-Sil. When special toughness is required or freedom from distortion is essential, the oil-hardening Graph-Mo is used. The steel used for coining and dies which have to stand tremendous pressure is called Graph-Tung.

Graphitic steel for drawing differs from the other steel for this reason. It has pores on the surface so minute that it takes a 100 power magnifying glass to see them. This condition allows drawing lubricant to be imbedded in these pores, which can not be scraped off by the drawing action of the punch.

For forming and drawing operations, low carbon, open-hearth sheet is preferable. In choosing the sheet for a drawn part several factors should be considered—the cost of the sheet, the effect of the sheet on press operations and die maintenance, the nature of the part to be made, and the desired finish on the product.

Low grade, unpickled sheet will quickly dull dies and cause galling of punch, because of the scale on the surface of the sheet. Sheets not having the proper anneal or being high in carbon will not draw or form well. The drawing quality of a sheet should be checked by a ductility test.

Chrome Ore and Chromium

ANOTHER new volume has just been added to the series of monographs on mineral resources issued by the Imperial Institute, South Kensington, S.W.7, England. It is a book of 118 pages on chrome ore and chromium, which like the others in this series covers every aspect of the nature, occurrence and utilization of the mineral with special reference to the deposits in the British Empire, which are both numerous and of high grade.

Some measure of the rapidly increasing use of chrome ore may be gathered from the fact that the world's output rose from less than a quarter of a million tons to more

than one million tons during the period between the close of the war of 1914-18 and the outbreak of the present war.

Uses of chromium in the metallurgical and refractory industries are dealt with in the monograph, which also discusses the mining and dressing of the ore, marketing and prices, and the world's production. The main bulk of the book, however, is devoted to the occurrence of chrome ore both in the British Empire and foreign countries, no less than 43 different countries being dealt with.

The Empire is very strongly situated in regard to supplies of

this strategic mineral, for Southern Rhodesia and the Union of South Africa are among the world's leading producers. India too possesses important deposits of chrome ore of good metallurgical grade, and Cyprus and Sierra Leone also contribute to the total output. In fact, just prior to the present war, about one-third of the world's output came from British countries and two-thirds was produced by companies under British control.

The monograph contains a large number of statistical tables of production and trade, and concludes with a selected list of references for more detailed reading.

New Equipment Review . . .

Die Casting and Injection Molding

Developments in machines for the molding of plastics and die casting of metals are here described.

Larger Die Casting Machine

ENLARGED die casting machine for zinc alloy is announced by *Madison - Kipp Corp.*, Madison, Wis., under the name of Giant Kippcaster model No. 500. The new machine has about twice the capacity of the standard model, but is more than four times heavier, thus providing the added strength needed for handling substantially larger parts. Whereas the smaller die caster is fully pneumatic, the Giant Kippcaster uses a combination of hydraulic and air power. The die head ram is operated hydraulically through a special toggle arrangement and cylinder. The standard hydraulic system is the Vickers combination pump mounted on a 1½-hp., 1200 r.p.m. motor. Die head measures 8x10 in., but clearance is provided so that larger dies can be applied. Both stationary and moving die can be of either 3 or 4 in. standard thickness. Stroke of ma-

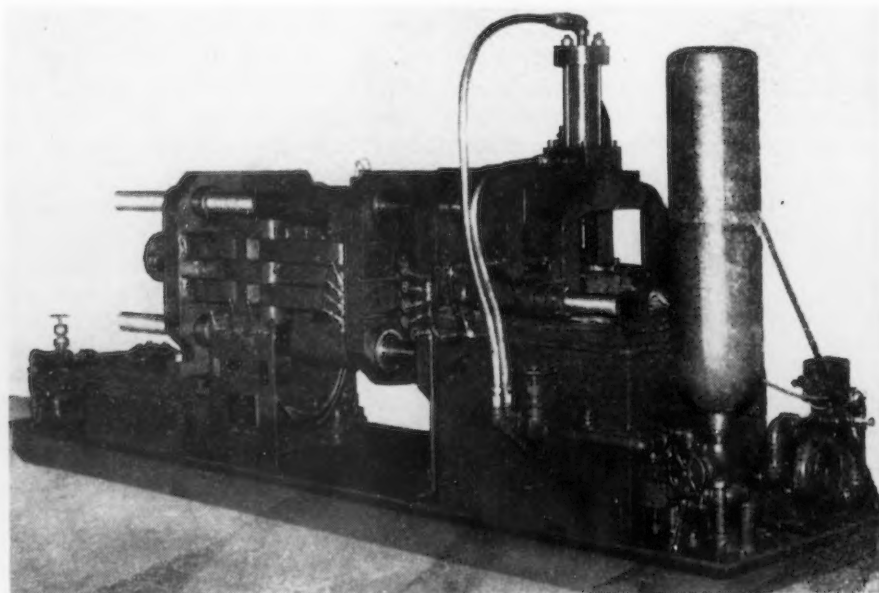
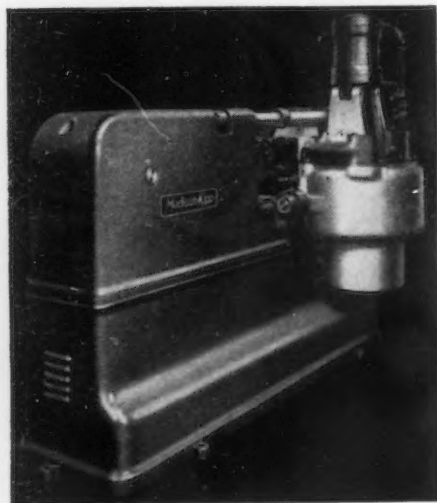
chine is 8.5 in., and with a standard metal plunger of 1.75 in., 1836 lb. pressure is exerted on the metal when the air pressure is 100 lb. The gooseneck with standard plunger has a capacity for shooting a 3.5 lb. casting of zinc alloy, and the pot capacity for zinc is 200 lb.

New Heavy Die Caster

TWO new and greatly improved high pressure hydraulic die-casting machines have been developed by the *G&M Mfg. Co.*, Cleveland: One is for casting zinc, tin and lead base alloys, the other for aluminum, brass and magnesium alloys. The machines are designed for increase in size and speed of production and reduction of waste by providing a tighter seal on dies, thus largely eliminating flash. The toggle arrangement permits moving and locking of the die plates with

a hydraulic pressure of less than 300 lb. against the actuating mechanism, but giving a locking pressure of approximately 500,000 lb. One feature of the toggle linkage is that no strain is exerted on the link pins in stopping the forward motion of the moving die plates, as would be the case if shoes or stops were used on the linkage themselves. Instead, the actuating movement of the linkage is stopped when the hydraulic piston comes in contact with the movable die plate when the die is locked. Steel hardened bushings are used on all bearing surfaces in the toggle linkage.

Tie bars also are unusually heavy, giving good alignment and reducing wear and breakage of aligning pins. All hydraulic regulating valves have been placed on the operator's side, all high-pressure piping is concealed in the



flanged base. Motor and pump are mounted on the base, and in casting zinc, tin and lead-base alloys, furnace and all burner equipment are likewise mounted. A hydraulic valve arrangement for ejecting and core-pulling is fitted on both types. Pump equipment is Vickers two stage.

Hydraulic System Die Casting Machines

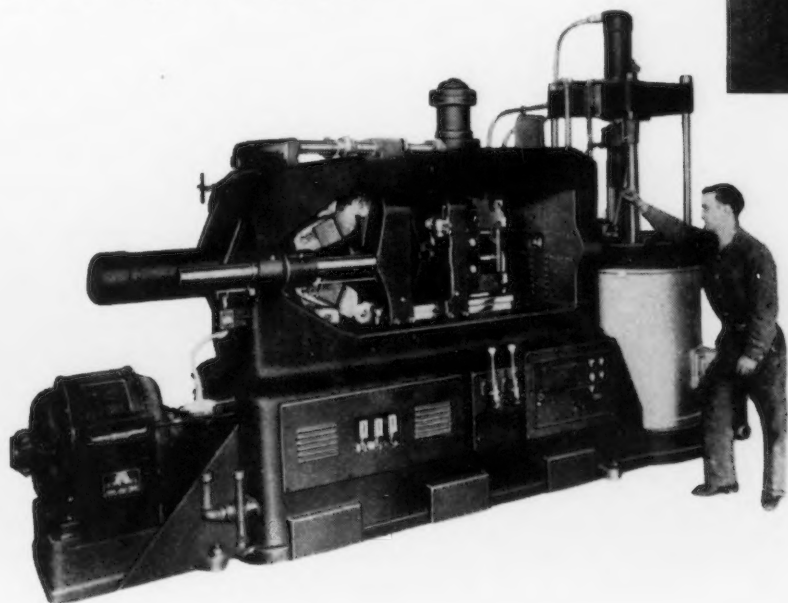
FOR both zinc, tin and lead alloys in aluminum, brass and magnesium alloys, *Phoenix Machine Co.*, 2711 Church Avenue, and *Lester Engineering Co.*, both of Cleveland, announce two new die casting machines. Identical in design, they have capacities for 12 and 19 lb. of zinc and are named HHP-2A and HHP-3 respectively. By changing pot and injection plunger they can be changed from operation of zinc group alloys to aluminum group. Mechanically some outstanding developments are claimed for the machine, new to the die casting art, but well established in the field of injection plastics. Solid beams replace tie bars, making for rigidity. Mold adjustment is through a worm-and-screw. This keeps mold platens in a parallel position. Mold-locking up to 800,000 lb. is attained by a hydraulically actuated link-and-link lock toggle system. Strain is removed from pins and taken up by heavy end plates through the toggle links. Mold opening and closing movements are adequately cushioned. The speed of the injection plunger and pressure on the metal are controllable. Sequence of operation is electrically controlled, as is the timing of each operation.

A limit switch assures that injection plunger can function only when the die is closed and locked, operating levers make possible a complete reversal of operation by a slight push. The pot is supported on a ring independently of the furnace, so that nozzle adjustment is easily made through a rack-and-pinion movement. The gooseneck and cylinder are very accessible.

Double Acting Vertical Injection Molding Machine

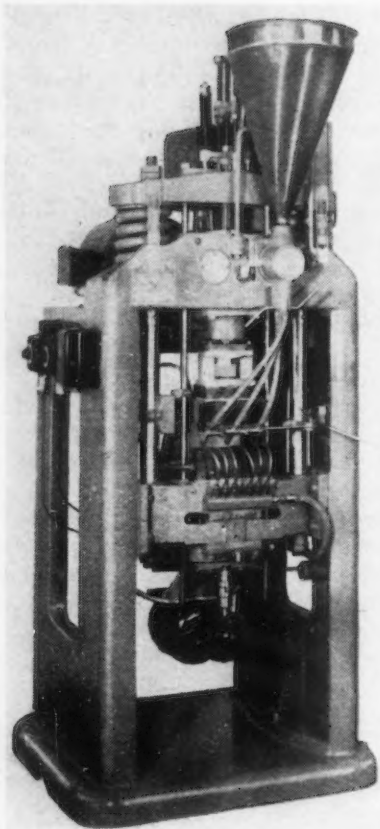
VERTICAL type injection molding press has been developed by *Hydraulic Press Mfg. Co.*, Mount Gilead, Ohio, and is called H-P-M Model 250-V-double-9. This machine has two complete injection units, one on either side of the vertical, downward-acting clamp press. Each unit is hydraulically synchronized in its movement with those of the press and has a capacity of 9 oz. of material per shot—18 oz. per cycle. Clamp press and injection units are individually operated by H-P-M radial pumps. Hydraulic power is employed throughout. Torque motor driven feed mechanisms automatically deliver

the granular molding material to the injection chambers. A circulating fluid, heated electrically by immersion elements, transfers the heat to the material in the injection chambers. Fully automatic hydraulic connections act between injection chamber nozzle outlets and mold inlets. For access to the nozzles, a wide separation can be obtained quickly. Direct straight-line hydraulic clamps fasten the molds together, as in the standard downward acting Fastraverse platen press. The radial pump provides a constant pressure against the clamp ram with a minimum of power consumption. An automatic control regulates this according to demand—maintaining output near zero when the ram is stationary while holding full pressure on the molds.



Automatic Threading and Molding Machine

THREADED parts such as bushings, knobs, ferrules, bottle caps, etc., can be produced swiftly and uniformly in plastics on the completely automatic molding machine announced by *F. J. Stokes Machine Co.*, Olney P.O., Philadelphia. Threads, internal or external, of any pitch may be molded, the speed of the unscrewing device being readily adjustable. Ejection is positive and synchronous with



the mold opening. No time is lost in producing threaded parts and the molding cycle is unchanged. By mounting separate molds in the machine and charging each mold individually—one, two or three moldings may be made simultaneously. Single, double or triple powder feed mechanisms are provided to charge each mold with an accurately measured amount of material. This automatic machine requires no operating attention, except refilling the hopper with molding powder and removing finished parts. It may be kept in continuous operation, producing 1000 moldings per cavity or even more per 24 hrs. One man can tend a large battery of machines. Since several operations are performed simultaneously the molding cycle is very short. Flash is almost eliminated.

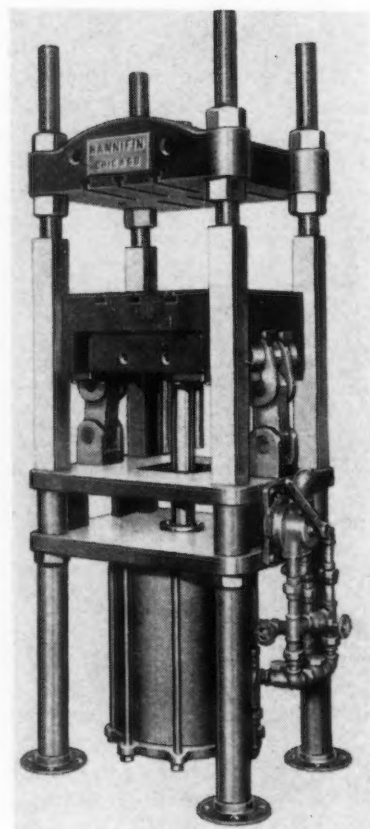
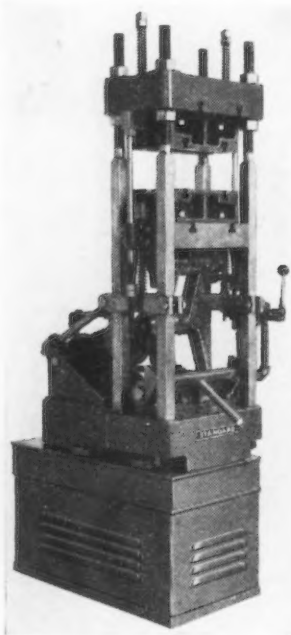
Automatic Plastic Molder

ALSO produced by the *F. J. Stokes Machine Co.*, is a large, 15-ton capacity, 10-in. stroke machine for molding thermo-setting plastics. This will produce moldings requiring up to 18 tons pressure and mold parts up to 4 in. height, 6 in. length and 19 sq.in. projected area. The machine features an ad-

justable bolster, reducing length of ram travel and increasing production rates on shallow work. Single-cavity molds are used. This model is fully automatic, self-contained, electrically heated and powered. It sounds a warning signal if a molding fails to eject or the material hopper is empty. The machine handles all free-flowing thermo-setting materials.

Light Plastics Molding Press

QUICK - ACTING toggle - type press for small pieces has been developed by the *Standard Machinery Co.*, Philadelphia, and is being sold by the *F. J. Stokes Machine Co.* Two 20-ton models have been designed, similar in capacity, stroke, etc. One is a self-contained, hydraulically - operated unit with motor and duplex pump in the base, while the other is designed for air operation, at 125 lb. pressure, and furnished without motor or pump. The 20-ton press is recommended for experimental purposes as well as on production work. Opening speed is 80 in. and closing speed 75 in. per min. Toggles open and close the press rapidly, and their movement automatically slows down as the mold closes. This molding action is especially advantageous when parts with inserts are being molded. Control of these presses is simple, a single, finger-operated lever being provided to release the closing and opening movements. Automatic time-cycle control can also be furnished.



Plastic Molding Press

DEVELOPED by the *Hannifin Mfg. Co.*, Chicago, a 50-ton plastic molding press is said to produce smoother and denser pressings. It develops 50 tons pressure at an air pressure of about 80 lb., which may be increased to yield up to 70 tons. Floor space is less than 5 sq. ft. and maximum daylight-space 29½ in. Provision is made for ejector pins or a separate ejector cylinder. A unique power stroke of 8 in. is said to make the press particularly suited for compression molding of thermo-setting plastics. The pressure is developed through a combination lever and toggle mechanism. The platen advances rapidly but decelerates when the dies begin to close, allowing time for the compound to soften. Rate of up travel and return speed are adjustable and full tonnage is applied to break the mold when reversing the cylinder. The press can also be furnished with a completely self-contained hydraulic power unit. A variable delivery oil pump maintains pressure during the cure through a 2-hp. motor. A similar press in 15-ton capacity and hydraulic presses for compression molding up to 300 tons capacity and higher are also available in the Hannifin line.

Shop Equipment Introduced In 1940

CONTINUED from the Annual Review issue of Jan. 2 is an itemized list of new equipment described in the pages of THE IRON AGE during 1940. In the first part of the summary were tabulated descriptions of machine tools, small tools and gages, presses and other sheet metal machinery; welding, foundry and forging equipment; heat-treating apparatus and finishing equipment. Finishing accessories are continued below, followed by classified items referring to material handling units, power transmission machinery, electrical equipment and plant service apparatus.

Spray Booths

- Binks Mfg. Co., Chicago, Roche low costApril 18, p. 54
Faraday Engineering Co., Boston, water wash typeApril 18, p. 55
Harris Soap Co., Buffalo, coating material for boothsDec. 12, p. 67

Paint Spray Outfits

- Binks Mfg. Co., Chicago, Roche DSApril 18, p. 55
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WANTED

New FULTONS,
EDISONS and CHRYSLERS

The great strength of the United States is not its billions of gold, its tons of metal or its giant industrial capacity. It is the native mechanical skill and inventive power of its people.

In a crisis, this democracy always gives us the men and the ideas the nation needs.

Usually, we imagine that these ideas come from the scientific laboratories or from the drawing boards of engineers. Many do. But just as many and just as great ideas come from the men at the machines of industry.

For scientists, there is the Nobel Prize. For engineers, a score of awards. But there is no award for the gifted men now working at the lathes, forges and work benches of industry.

As a contribution to our national security, Revere Copper and Brass Incorporated is establishing an award of \$10,000.00 for the workmen in America's metal working industries.

Donald D. Allen
PRESIDENT

REVERE COPPER AND BRASS INCORPORATED



The REVERE AWARD

of \$10,000 for Wage Earners in America's Metal Working Industries

THE Revere Award is made by Revere Copper and Brass Incorporated to help speed national defense by encouraging the mechanical genius and inventive talent of American wage earners.

The Revere Award totals \$10,000.00 divided as follows:

1st Award	\$5,000.00
2nd Award	2,500.00
3rd Award	1,000.00
4th to 9th Awards	250.00 each

The Revere Award is open to all wage earners (foremen and workingmen) in the metal and metal-working industries and to all machine maintenance men.

Each entry remains the property of the sender.

Selection will be made by an impartial Jury of

Award consisting of men high in science, labor, the Army, the Navy and industry. The decision of the Jury of Award will be final.

Winners will be chosen for the inventions, devices, improvements or ideas which, in the Jury's opinion, contribute most to speeding up America's Defense Program.

It is desired that all entries be placed at the command of the Defense Advisory Council at Washington, D. C., subject to the entrant's own written consent.

Two or more men may cooperate in any entry. Entries close on midnight, April 30th, 1941.

For booklet giving complete details of The Revere Award and for Entry Blanks simply write to THE REVERE AWARD COMMITTEE, P. O. Box 1805, Washington, D. C.



DETROIT — Unrelentingly following up the rising defense boom, the UAW-CIO is translating the boom into dollars and cents. Reports of new contracts and wage increases in the latter half of December came too rapidly even to be tabulated by the year end and some more are on the way. Already reported as added to the Chrysler payroll is \$6,744,000 in the form of bonus and wage increases and \$150,000 in the form of bonus to the Hudson payroll. The Chrysler agreement was followed by an agreement with Briggs that added \$1,060,000 in the form of bonuses and hourly rate increases. Terms of the agreement with Briggs, supplier of Chrysler bodies, were almost identical with the Chrysler agreement earlier reported.

Most recent wage boost is that agreed to by Packard and ratified just before the new year by 889 members. It will add another \$1,250,000 to Packard's payroll during the coming year, on the basis of expected employment. The union made public correspondence with C. E. Weiss, Packard's industrial relations manager, establishing the wage raise in lieu of paid vacations. The wage increase amounts to 3c. per hr. for all hourly rate workers and runs up to 7c. per hr. in some cases.

Janitors Get 80c Per Hr.

An example of the wages being paid now in Detroit may be of interest to others in the country. Janitors' wages at Packard, it is understood, are increased from 75c to 80c per hr. As a matter of comparative interest, the Briggs contract for the aviation division establishes a minimum of 75c for male workers and 65c for women. Rates for production workers and skilled labor are higher in the Briggs contract, of course. In contrast with the Briggs minimum of 75c, the most recent aviation contract with the union, the one signed by Vultee after the prolonged recent strike, establishes 62½c per hr. in the California plant. The union claims, by the way, that it has a contract with one Detroit plant for a minimum of 90c per hr., including sweeper.

At the time of the first report here about UAW agitation against Army orders granted to Ford (Dec. 12), the full weight of UAW attempts to capture the Ford domain had not become fully apparent. The battle really began to become "public property" on Dec. 22 when Ford used full page newspaper advertisements to drive home some facts about Ford's wage rates. Ford listed minimum rates as follows: Unskilled non-productive, minimum hiring wage, 75c per hr.; semi-skilled, both non-productive and pro-

On The Assembly Line

BY W. F. SHERMAN

Detroit Editor

• UAW-CIO unions in Detroit successful in obtaining new contracts with higher returns in wages and bonuses . . . Ford Motor Co., defending its labor policies, publishes ads in many newspapers . . . Buick and Studebaker to make airplane engines.

ductive, minimum hiring wage, 80c; skilled productive employees, minimum hiring wage, 90c. Ford claimed that an average annual wage of \$1,629.05 was paid to Ford employees during the year ended Nov. 30, 1940.

The union came back with a statement which attempts to prove that the Ford yearly wage is lower than the average for the industry:

"Ford's quoted annual wage of \$1,629.05 in the ad represents at an average 90c. hourly wage, 1810 hours of work per year. This is roughly 45 weeks of employment at 40 hr. per week. The 90c. Ford average rate, as published by Ford in a previous ad, has not been denied by the company in this ad. At the Chrysler average hourly rate of \$1.06 such employment would bring in

an annual wage of \$1,918.60. At the industry-wide average of 95c. this would bring an annual wage of \$1,679.50."

The union has posed a pretty problem for Ford and the National Defense Commission in its insistence that contracts should not be awarded to Ford because the company has not capitulated to demands for unionization. Meanwhile, it is concentrating every effort on increasing its membership among Ford employees and in keeping everyone keyed up for a showdown. Most recent move has been the petitioning of the Detroit office of the National Labor Relations Board for an employee election in the Lincoln plant of Ford Motor Co. to determine whether the UAW should be granted exclusive bargaining rights. The petition was filed shortly after it was announced by the UAW that its members had authorized the calling of a strike at Lincoln. About 3800 workers are employed in the Lincoln plant.

Ford Agitation Being Kept Up

Previously the UAW had asked a consent election at the Rouge and Lincoln plants and the union had sent registered letters to the company, asking for a conference with the management. No replies were received to the letters apparently.

The Ford issues are not being allowed to die, however. James F. Dewey, Federal Labor Department conciliator who held a conference with Harry Bennett, Ford personnel chief, on Dec. 20, was scheduled for more meetings during the past week with Bennett to discuss the layoff of 300 men. Bennett has declined to discuss any of the charges.

Meanwhile, in other plants in the industry every few days there is an announcement of strike vote, or pending strike vote, generally over some alleged

discrimination or failure on the part of plant management to carry out all the provisions of the collective bargaining agreement. Privately, it is suspected that in many of these cases the fuss raised is simply preliminary to bringing about negotiations which will result in lifting the wage scale to the level attained in other recent contracts.

Buick, Studebaker to Make Airplane Engines

Anticipated for many months is the announcement late last week by the War Department that Buick and Studebaker will engage in the manufacture of aircraft engines. Also believed to be forthcoming is a similar announcement about Hudson. These have been mentioned previously in the "Assembly Line." A comparison of the figures released so far in the case of Buick and Studebaker indicates that the program will be substantial. A total of \$24,313,150 is slated for plant expansion at Buick and approximately \$36,799,300 at Studebaker. These can readily be compared with similar appropriations in the case of Ford (about \$21,000,000) and Packard (\$30,000,000). Still unknown is the size and dollar volume of the contracts which will be awarded for engine production but it is expected that they will approach \$150,000,000 each.

The programs are all similar to the one being prepared by Continental Motors Corp. except that Continental's production of Wright engines will be for installation in tanks rather than in airplanes.

Confirming the War Department announcement about Buick, Harlow H. Curtice, head of Buick, said that negotiations had been under way for some time looking to the manufacture by Buick of Pratt & Whitney 14-cylinder air cooled engines of 1830 cu. in. displacement.

Curtice said that details of the project are still in negotiation, with decision yet to be made as to location of the projected plant and other important arrangements.

It goes without saying, of course, that all of the automotive companies engaging in manufacture of airplane engines will be required to provide complete new tooling and in almost every instance (Packard being a partial exception) a complete new plant.

Continental escaped the necessity of erecting a new plant because its Detroit buildings were vacated

A Safe Way to LOWER the Cost of Your STAINLESS JOBS

IngAclad Stainless-Clad Steel now has a record of nearly 10 years of successful use in the leading industrial plants of America. You will find it in the Chemical Plants of DuPont, Monsanto and others . . . in the Food Plants of Standard Brands, General Foods, Penick & Ford, etc. . . . in the Soap Plants of Procter & Gamble, Andrew Jergens Co., etc. . . . in the Textile Mills of Southern Bleacheries, etc. . . . in leading Paper Mills, etc.

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1. Although its deep cladding of stainless gives perfect protection on the contact side of the metal, its cost per pound is much lower than the solid metal, making possible large savings in the material cost.
2. IngAclad handles more easily in fabrication. Any given thickness of this metal from 18 gauge sheets to 1 1/4 inch plates, is much easier to work than the solid stainless metal.

No Difficulty in Welding

We provide any interested fabricator with a complete Welding Manual, giving specific instructions for practically every type of job. Fabricators are invited to send for this Book . . . Free on request.

Investigate the economies of IngAclad Stainless-Clad Steel. If you are interested in Stainless protection at lower cost, ask your fabricator to quote on IngAclad . . . the one Stainless-Clad Metal with a 10-year record. If you are quoting on jobs, meet all competition by taking advantage of the savings IngAclad offers.

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STEEL & DISC DIVISION**
BORG-WARNER CORPORATION
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Plants: Chicago, Ill.; New Castle, Ind.; Kalamazoo, Mich.



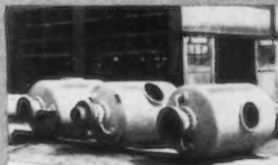
Unretouched photo of machine-cutting. Note the inseparable bond.

INGACLAD

STAINLESS-CLAD STEEL



Coca-Cola Syrup Storage Tank fabricated of IngAclad Stainless-Clad Steel.



Cereal Cookers fabricated from IngAclad by Leader Iron Works, Decatur, Ill.



Direct-fired Paint and Varnish Kettles fabricated from IngAclad.



Tanks lined with IngAclad SHEETS protect color and flavor of Corn Syrup.



Laboratories of Eli Lilly use IngAclad Stainless-Clad Steel in this Gelatin Room.



Dye Jig, Holliston Mills, Kingsport, Tenn., fabricated of IngAclad Stainless-Clad Steel.

1940 Statistics of Motor Car Industry

(Reported by Automobile Manufacturers' Association)

Car and truck factory sales, from U. S. plants.....	4,476,000
Passenger cars	3,705,000
Motor trucks	771,000
Percentage increase over 1939 Motor Vehicles.....	25%
Motor Vehicles registered in U. S.....	31,950,000
Motor cars	27,300,000
Motor trucks	4,650,000
Number of motor vehicles exported from United States.....	230,500
Per cent of U. S. production exported	5.1%
Motor trucks in use	4,650,000

The motor vehicle industry has undertaken to produce many types of defense equipment. Contracts now total.....\$1,076,082,000

Partial list:

Motor vehicles of all types
Armored tanks
Aircraft engines and parts
Airplane controls and instruments
Anti-aircraft fire control apparatus
Machine guns
Ammunition components (cartridges, shells, bomb parts)
Field range cabinets
Submarine engines and parts
Recruiting station trailers
Compasses
Drift meters
Radio apparatus
Half-track personnel carriers
Marine engines

when all its regular work was moved to Muskegon, Mich., leaving the old plant here available for aircraft work.

A 65,000 sq. ft. addition to the year-old plant of the Toledo Scale Co. on Telegraph road, just below

the Michigan-Ohio line, has been announced, the announcement being made in a special short wave broadcast around the world delivering New Year's greetings from Toledo manufacturers. The approximate cost of the plant addi-

tion will be \$100,000. The factory space will be on the rear of the present plant and will correspond with present construction. It will be an L-shaped building that will provide added capacity for several departments.

The plant is now making wind tunnel equipment for large wind tunnels. Five sets of equipment are being built, ranging from \$50,000 to \$60,000 each. This is balancing, or weighing equipment, to determine forces acting on scale models during tests. Also the company has had substantial demand in recent months for automatic weighing equipment for government ammunition and shell loading plants.

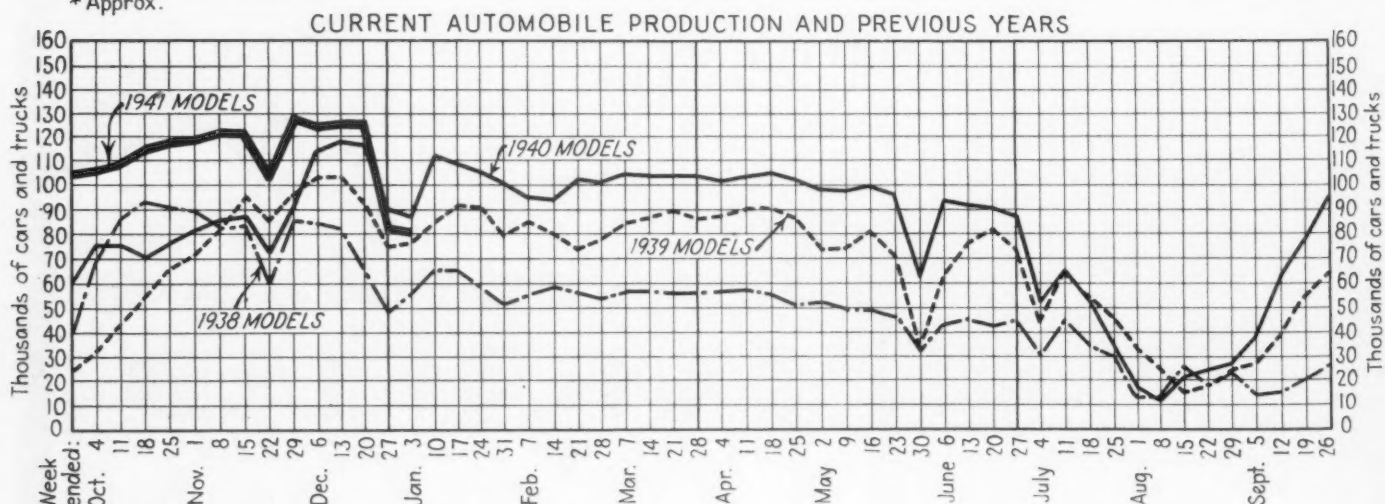
Holiday Cuts Production

Inventory periods and shortening of the work-week because of the new year holiday brought automobile production for the week ended Jan. 3 down to 76,690 units, compared with 81,295 in the previous week and 87,510 in the corresponding week of last year, according to Ward's Automotive Reports.

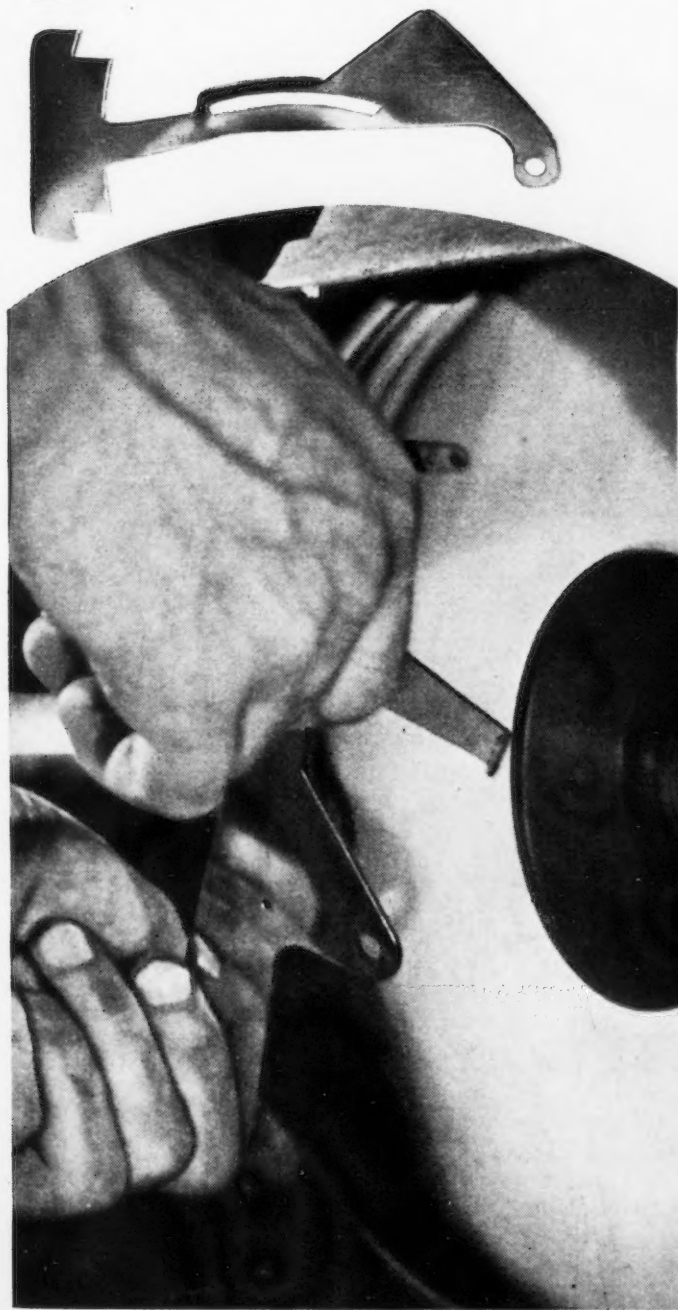
C. Harold Wills, whose death occurred last week, was one of those individuals whose contributions to the automotive industry are almost impossible to measure. Few men have contributed more to the evolution of the automobile or to the development of Detroit as the world's automotive capital.

PRODUCTION COMPARISONS					
	Oct., Nov., and Dec.	Jan., Feb., and March	April, May and June	July, Aug., and Sept.	Total
1938 MODELS	1,032,201	753,470	628,961	313,091	2,727,723
1939 MODELS	1,014,799	1,086,350	971,417	510,561	3,583,127
1940 MODELS	1,162,990	1,325,630	1,233,585	583,568	4,305,773
1941 MODELS	1,575,000*				

* Approx.



FOR *Speedier* PRODUCTION
OF Stainless PARTS

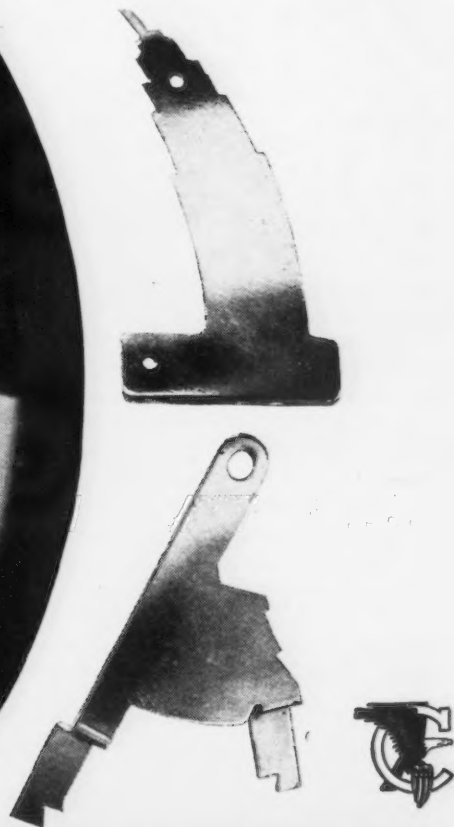


FROM the press room straight through to the finishing department, this Stainless Strip speeds your production.

Intricate shapes and high precision are more readily obtained because of its uniform temper and absence of hard spots. Tool troubles diminish for the same reason. Faster press speeds and steadier output result from its uniform response to press operations. Even the buffing time is cut down by the satin-smooth finish that brightens quickly on the buffing wheel.

That's why Carpenter Stainless Strip rates so high among production men. It has helped them out of many a tough spot—made possible many a Stainless part that proved too difficult for other Stainless Steels. There is a grade of Carpenter Stainless Strip to provide just the degree of corrosion resistance you need. Specify *Carpenter* to insure smoother, faster production all along the line.

THE CARPENTER STEEL CO. • Reading, Pa.



Carpenter STAINLESS STEELS

BRANCHES AT Chicago, Cleveland, Detroit, Hartford, St. Louis, Indianapolis, New York, Philadelphia

WASHINGTON — In support of the contention that steel capacity should be increased to meet defense and civilian requirements, figures have been published to show that they exceed by some 10,000,000 net tons the present rated capacity of 83,000,000 tons. The figures, so it is said by a pair of columnists who published them, are taken from a study made by the National Defense Advisory Commission Priorities Board.

The total requirements are estimated as follows: June 1941-June 1942, direct Army and Navy orders, 4,500,000 tons; exports, 15,000,000 tons, chiefly to Great Britain; civilian requirements and indirect defense needs "for such things as machine tools," 74,000,000 tons. These estimates total 93,500,000 tons. This exceeds by 10,500,000 tons the present rated ingot capacity.

It is to be noted that these figures are estimates only. It is also true that the calculation is only one of a number of studies on steel requirements that have been and are being made for the defense commission just as its Bureau of Statistics and Research is making like studies regarding requirements of other products.

The studies may be considered tentative. By the very nature of the problem many of the figures are based on the best estimates the bureau can make. The figures given are said to be maximum totals. Other studies are reported to be based on smaller estimates. Until more definite determinations are reached official figures will not be given out. In fairness to the bureau itself it should be pointed out that it is engaged in a sincere statistical effort and is not reflecting any school of thought. It is not attempting to uphold the views of either those who do or those who do not think the steel capacity now existing and under construction will be adequate.

93,500,000 Figure Too High?

The figure of 93,500,000 tons, still some 1,500,000 tons under the 95,000,000-ton total some government economists estimate as necessary, is of course held to be far too high by those who maintain present capacity and that now being built will meet all requirements.

Even those who favor sharp expansion in steel making capacity have expressed the belief that the 93,500,000-ton estimate overshoots the mark. For one thing they have expressed the opinion that the 4,500,000-ton estimate for the Army and Navy is enough to cover also Maritime Commission requirements for

Washington
BY L.W. MOFFETT
Washington Editor

• Study made for Defense Commission's Priorities Board finds 10 million ton increase needed in nation's steel capacity . . . Estimates civilian, "indirect defense" requirements at 74 million tons although 10-year average consumption is 47.5 million tons.

merchant ships. The 15,000,000-ton export figure is said to be based on August exports of practically 654,000 tons of pig iron, semi-finished and finished steel to Great Britain and exports to other countries. They expect exports to increase over the August figure which was a little in excess of 1,000,000 tons. It is admitted that the figure can be only an estimate and nothing more. Exports to Great Britain and Canada, the two greatest foreign markets, are currently running at the rate of about 9,000,000 tons of ingots a year.

When it comes to the 74,000,000-ton requirement for civilian and "indirect defense needs" it is conceded that the estimate definitely is on the "rough" side. That this is so is seen from the fact that the average

domestic consumption of steel, in terms of ingots, over the past 10 years, has been only about 47,500,000 tons, leaving a tremendous gap of 26,500,000 tons to make up the estimated civilian and "indirect defense" requirements of 74,000,000 tons. The "indirect defense" requirements, it is pointed out, include ton-nages that are also calculated in the "domestic consumption" total (such things as machine tools), though obviously defense needs will call for increased tonnages for this purpose.

"Piratical" Steel Producer

One particularly vicious statement in the published report said that "the more piratical steel men rather look forward to a time of (steel) shortage and price inflation." The statement not only is reprehensible because of its odious character but also by reason of the ignorance it reflects. No industry is striving more earnestly to avoid price rises. Indeed it has given the government a virtual guarantee that prices will not be advanced above their present levels provided the industry is not compelled to pay increased raw material and wage costs.

The published report, however, is correct when it says that many steel men "fear to give the government greater power over their business by an expansion that would probably be government financed. And finally, like so many of the machine tool men, they all remember they were bitten by expansion once before and do not want to be again."

At the same time it has been pointed out that the steel industry is imposing no limit upon its cooperation with the government in meeting all needs for national defense, and is now expanding and making necessary improvements to meet large scale demands.

AGAIN GENERAL ELECTRIC

REDUCES LAMP PRICES!



New savings on amazing new **G-E MAZDA FLUORESCENT LAMPS**

EVERY day the story of G-E MAZDA Fluorescent lamps grows more amazing. So swift has been the acceptance of this new, cooler, high-efficiency light source—so wide-spread has become its use throughout industry—so steady has been the development of new G-E manufacturing economies—that again General Electric announces lower prices. Again General Electric passes its savings along to you!

Now fluorescent light costs less than ever before. You can use more of it—to help speed production, step

up sales, cut errors. You can have "windows of daylight" everywhere—better work with less eyestrain—daytime morale on the night shift! You can have the new higher levels of light needed to keep your business forging ahead—and have it at less cost than ever now.

Ask your electric service company or G-E MAZDA lamp distributor to help you choose the fixture best suited to your needs. And be sure you get G-E MAZDA "F" lamps. They're made to give maximum light for current consumed. *Made to stay brighter longer!*

Before you buy any type of FLUORESCENT LIGHTING ask yourself these questions:

1 Are you getting a wide enough choice of fixtures so that your fluorescent lighting meets your **INDIVIDUAL** needs?

2 Is the performance of the fixtures and ballasts and starters certified for best lighting results by Electrical Testing Laboratories?

3 Are you getting G-E MAZDA Fluorescent Lamps, which give all the efficiencies and economies of MAZDA Research?

NEW LOW PRICES ON G-E MAZDA "F" LAMPS

Jan. 1st, 1941

15-watt T-8 (daylight or white†)	was 95c	NOW 85c
20-watt T-12 (daylight or white†)	was \$1.25	NOW \$1.10
30-watt T-8 (daylight or white†)	was \$1.25	NOW \$1.10
40-watt T-12 (daylight or white†)	was \$1.90	NOW \$1.60
100-watt T-17 (daylight or white†) (recently introduced)	was \$3.75	NOW \$3.50

Prices also reduced on colored G-E MAZDA "F" Lamps

† Standard white (3500°K)

G-E MAZDA LAMPS

GENERAL ELECTRIC

Defense Needs Open Way for Monopolies, Arnold Declares

Washington

• • • Assistant Attorney General Thurman Arnold, head of the Justice Department's anti-trust division, last week called it "particularly urgent" in the face of the defense program to keep anti-trust machinery at "full strength."

In his annual report submitted to Congress by Attorney General Robert H. Jackson, Mr. Arnold reiterated a statement he made a year ago on the problem of monopoly and restraint of trade, adding:

"That picture is just as realistic now as it was then. Moreover, the preparation for national defense inevitably opens the door for even greater concentration of industrial wealth and power. It is well known that large scale expenditures for military purposes are always accompanied by the

danger of booming prices and by other dangers born of relaxed business standards and relaxed public vigilance.

"In these times, when all ramparts need to be watched, it is particularly urgent that a domestic rampart such as anti-trust enforcement be kept at full strength. The existing emergency is as much an emergency for our economic structure as for our external security. Those vigorous methods which have always been the hope of combating a drift toward monopoly and whose fruits we are just beginning to enjoy must not now again be abandoned."

Mr. Arnold did not disclose what he plans in the way of increased appropriations for his division next year but he characterized as a "delusion" the assertion that anti-trust enforcement is "already on a sure footing or is proceeding

Defense Plant Outlay Almost \$700 Million

• • • Contract awards for plant expansion, construction and equipment approved by the National Defense Advisory Commission to date involve 80 plants and total nearly \$700 millions..

Included among these are high explosive plants, ammunition loading and manufacturing establishments, armor plate factories, tank and aircraft plants.

Types of contracts vary from strictly government-owned munition works, operated on a fixed-fee basis, to contracts financed by private manufacturers, amortized by government payments over a period of five years, with a purchase option remaining with the manufacturer.

at an adequate pace." The truth is, he said, that "we have scarcely touched the task that needs to be done."

After giving a brief description of the successive stages through which anti-trust prosecutions pass and estimating that three years are required, the Assistant Attorney General reported that with an appropriation of \$1,325,000 for the fiscal year 1940 the division received 3412 complaints, instituted 92 cases, and conducted 215 major investigations. In 1939 the division had an appropriation of \$780,060, received 1375 complaints, instituted 13 cases, and conducted 90 major investigations.

Observing that the problem of monopoly and restraint of trade can best be described in the same terms used in last year's report, Mr. Arnold cited these excerpts:

Evidence presented before the Temporary National Economic Committee indicates that one company produces 100 per cent of the country's aluminum supply; three companies produce 90 per cent of the cans; four companies produce 100 per cent of the corn binders; three companies account for more than 60 per cent of the steel supply; three companies produce 85 per cent of the automobiles; four companies produce 78 per cent of the copper; and four companies produce 64 per cent of the iron ore.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



Bethlehem Gets Forgings Contracts

Washington

••• The Navy Department has awarded a \$7,275,484 contract to Bethlehem Steel Co., Bethlehem, Pa., for gun forgings. A \$1,239,000 award was made at the same time to the Kelsey Wheel Co., Detroit, for projectiles.

Expansion of facilities to cost \$61,112,450 for the production of aircraft engines for the War Department by two prominent automobile makers has been approved by the President and the National Defense Advisory Commission. Studebaker Corp. will expand its plants at South Bend, Ind., and at Chicago, at an estimated cost of \$36,799,300 for the production of Wright Aeronautical "2600" engines. The Buick Division of the General Motors Corp. will expand its facilities at Grand Blanc Township, Genesee County, Mich., at an estimated cost of \$24,313,150 for the production of Pratt & Whitney "1830" engines.

The projects marked the further extension of aircraft engine manufacture by automobile manufacturers. Previously contracts were awarded the Packard Motor Co. and the Ford Motor Co., for such production.

Approval also has been given for expansion of aircraft facilities of the North American Aviation, Inc., Inglewood, Cal., at an estimated cost of \$2,270,405 for the production of airplane frames. Also approval was given for the construction of a new turbo supercharger plane by the General Electric Co., at Everett, Mass., at an estimated cost of \$5,873,800 for the production of superchargers.

The new facilities will be constructed under the terms of the emergency plant facility contract. The company in each case will furnish the funds for the construction. Under the contract, the Government will repay the cost of the plant expansion over a period of five years.

At the end of five years, the contractor will have the option to purchase the property at cost less some prearranged rate of depreciation or, alternatively, at some

negotiated sum. In the event he does not choose to retain the property, title will be transferred to the Government.

Witherow, Heads NAM Defense Committee

Pittsburgh

••• William Porter Witherow, Pittsburgh steel manufacturer and president of Blaw-Knox Co., has accepted the 1941 chairmanship of the National Association of Manufacturers' Committee on

Electric Boat Plans One Sub Each Month

Boston

••• The Electric Boat Co., Groton, Conn., with orders for 41 large undersea craft in addition to three now at the fitting-out dock, has plans for taking on 2500 new employees during the next nine months for the purpose of stepping up deliveries of one submarine a month to the Navy. The company recently hired 1300 new workers, bringing its force up to 3900. The present delivery schedule is one submarine every three months, but the company expects to be on a one submarine per month schedule by November or December.

National Defense and Industrial Mobilization. A special NAM group will be named to act as a liaison between government agencies affected. Another sub-committee will deal with proposed legislation on national defense as relating to industry. In addition sub-committees will be formed to study priorities, prices and production problems.

Dredging, Road Machinery Output Lower in 1939

Washington

••• The 1939 output of dredging, excavating, road-building and similar machinery (except mining and oil-field machinery and tools) was valued at \$140,137,586, a decrease of 5.2 per cent compared with \$147,901,544 in 1937, according to the Bureau of the Census.

Roosevelt to Get Steel Plant Survey

Washington

••• A survey of steel making facilities in terms of defense requirements for the months ahead was expected to be placed before President Roosevelt this week by the National Defense Advisory Commission after the President expressed the opinion that defense needs will require a further increase of steel producing facilities.

Mr. Roosevelt referred to the expansion program of the Tennessee Coal, Iron & Railroad Co., and the Bethlehem Steel Co. T. C. I. will increase its open hearth capacity by 400,000 tons and the Bethlehem Steel Co. by 850,000 tons a year. The President commented that the total steel capacity increase will be 2,000,000 tons annually, a slightly conservative figure in view of the additional 900,000-ton electric furnace capacity now being installed. Referring to the Defense Commission survey which he said would reach his desk within a week, the President observed that in his judgment it looks as if producing facilities would have to be further expanded.

Asked at his press conference last Friday if he thought existing steel supplies were adequate, Mr. Roosevelt's first reaction was that he hoped so. He then recalled that government defense experts sought the advice of the steel industry last summer and received assurances that facilities for producing plates, shapes and bars were adequate for the defense program. Since that time, he continued, the defense program has moved forward at a much greater pace than at first was believed necessary. Some steel companies have taken the position that expansion is necessary, the Chief Executive said, referring to the expansion programs undertaken by Tennessee, Coal, Iron & Railroad Co., and the Bethlehem Steel Co.

Commenting on reports that the defense commission is negotiating with other steel companies for the construction of additional steel facilities, reliable government sources in close touch with the steel situation categorically denied that such negotiations are under way.

Fatigue Cracks

—BY A.H.DIX—

One Lover, Many Pillars

A writer in our American contemporary (THE IRON AGE) refers to having read "Lady Chatterly's Lover," by T. E. Lawrence. One can only hope that, having read all about that lady's one (and only?) lover, he now feels as wise as one (just one) "Pillar of Wisdom."

—"Marksman," in The Foundry Trade Journal (England)

We checked up on it again and find we were right in giving the lady only one lover, a saturnine gamekeeper. If "Marksman's" edition has more than one we would like to read it. We apologize, however, for mixing our Lawrences. It was D. H. who wrote "Lady Chatterly's Lover" and T. E. who wrote "Pillars of Wisdom," a work we have missed so far with much delight, having stumbled through his "Revolt in the Desert" as painfully as a hamstrung camel.

Slipping It In With The Grain

••• We see by the papers that the Egyptian Government has cracked down on an Italian textbook "Aritmetica Practica," by Cantardo Baffi, on the ground that its arithmetic problems were so worded as to spread Fascist propaganda.

It is well known that ideas can be introduced into the mind with far less resistance by the tangential method than directly. Every nation colors its history books, but so far this country has shown a shameful lack of imagination in the type of problems given in arithmetic and grammar books. They are mostly about mythical farmers who sell eggs for 25c. a dozen, banks that pay 3½ per cent interest, steaks that retail at 20c. a lb., Sunday school teachers that take their charges on picnics in a horse and buggy, and boys named John who are always giving away apples.

Thus the children get a misconception of the facts of life, and, what is worse, valuable opportunities for advertising are lost. If, instead of boring the young mind with an example about a purely hypothetical shepherd who started off with so many sheep, acquired so many lambs, and lost so many in a blizzard, and how many did he have then, how much more interesting and practical would it be to introduce a simple problem like this:

If a certain trade journal, known as "The World's Greatest Industrial Paper," started off the year 1940 with 14,114 subscribers, added 5301 and lost 3814, how many did it have at the end of the year?

Sound Sales Idea

••• The smartest slogan we have seen recently is one coined by a London bookshop—"Read while they raid."

The Girl Grew Fatter

••• Don James, your Cleveland Argus, furnishes us with proof of the danger of using a slogan based on a statistical position. Cleveland's slogan was "The Fifth City." As it is now the sixth, those businesses that loyally made "Fifth City" a part of their corporate names are placed in an awkward position. The current Cleveland telephone directory lists:

Fifth City Auto Wrecking Co.
Fifth City Furniture Auction
Fifth City Furniture Exchange
Fifth City Garage & Lumber Co.
Fifth City Realty Co.

No concern is listed as the Sixth City so-and-so. How much wiser are those municipalities that call themselves "The Queen City," "The Garden City of Oskaloosa County," "The Gem of the Prairie" or some other slogan that frees them of the fear of the decennial audit's revelations?

But even when choosing an unstatistical slogan it is well to err on the side of conservatism, for a flattering slogan becomes ridiculous when the ravages of time cause it to vary widely from the truth. A city can find itself in the embarrassing predicament of a girl whose loving helpmate endows her with the endearing nickname of "Toots" during her 115 lb. bridal days and who finds it less bearable than a wart on her nose years later when her poundage qualifies her for the Stanford line.

Stoppers

How to Take a Plane in the Air Without Leaving the Ground—Goodrich
You Can't Eat Wire Rope—Roebling
600 Horses Flatten the Hills of San Francisco—Allis-Chalmers
Sundstrand Prays for Peace—Sundstrand Machine Tool Co.
So, You Have the D.T.'s—Lincoln Electric Co.

That photographic spread of the United Engineering & Foundry Company's on pages 218-219 of last week's issue is an advertising novelty. It hasn't a single word of text.

And Gallons Of India Ink

••• A statistic that startled us was uttered by Clifford S. Stilwell, executive vice-president of Warner & Swasey, in his excellent broadcast address, "All Out for Defense." He said that it takes 30 tons of blue prints to build a battleship.

Clean Rhyme And Scalp

••• G. D. Hartley, Worcester, Mass., writes that he sympathizes with us in our aim to keep this page clean, but says truly that the passion for purity can become a nuisance if allowed to run wild. For instance, a friend of his entered upon this poem in a dandruff remedy contest and it was rejected on grounds of impropriety:

"Excuse me, Sir," an angel said,
As Jones stepped from a cloud,
"You cannot go to meet your God
With dandruff on your shroud."

Apronym

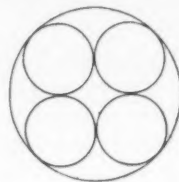
••• The Electric Equipment Co., Rochester, N. Y., postcards us that that city has an undertaker named Allen E. Dye. It would be nice if he and George Bury, the Kenmore, N. Y., undertaker, would get together. Dye & Bury would be practically irresistible.

Puzzles

••• Our guess is that the order of selection in last week's problem is Jones, Brown and Smith, but we don't know whether it was Brown or Smith who lent the umbrella.

This headache is from B. H. Hawkins of Armstrong Metal Products, Inc., London, Ohio:

A farmer with four sons has a circular farm. He gives each son a small round farm as shown in the smaller circles. The area in the center, bounded by the four smaller farms is 36 acres. How many acres are there in each small farm and how many in the original farm?



CAST OF Copper TO MAKE

BETTER MOTORS!



THERE'S no motor so capable of standing up under strenuous service as the motor with the one-piece rotor winding centrifugally cast of SOLID COPPER. For copper has better electrical conductivity, better thermal characteristics for motors . . . than any other metal.

So for years manufacturers have striven to produce such rotors. Many have succeeded in centrifugally casting windings of other metals. But *only* Fairbanks-Morse makes a centrifugally cast rotor with the windings of solid copper.

F-M Motors with the patented features of Copperspun rotors better withstand constant plugging and reversing, give added years of trouble-free operation, reduce operating costs. Their plus values are worth investigating. Write Fairbanks, Morse & Co., Dept. 47, 600 S. Michigan Avenue, Chicago, Ill. Branches and service stations throughout the United States and Canada.

7853-EA40.160

Copperspun

FAIRBANKS · MORSE MOTORS

DIESEL ENGINES ELECTRICAL MACHINERY RAILROAD EQUIPMENT WASHERS-IRONERS STOKERS
PUMPS FAIRBANKS SCALES WATER SYSTEMS FARM EQUIPMENT AIR CONDITIONERS

News of Industry...

Defense Work Puts Jones & Lamson Plant on 161-hr. a Week Schedule

••• Vital machines at the Jones & Lamson Machine Co. plant at Springfield, Vt., are being placed on a schedule providing 161 hr. of operation weekly against 131 hr. heretofore, according to J. E. Lovely, vice president, thereby increasing output from one quarter to one third.

Jones & Lamson, which is tak-

ing steps to increase outside contracting work already 40 per cent of the machine hours performed in its own plant, has been running two shifts of 60 hr. each, giving a regular schedule of 120 hr. per machine week. Saturday afternoon and Saturday until midnight have been used to balance up, giving an added 11 hr., making a

maximum total of 131 hr. a week for any machine.

The new schedule, Mr. Lovely says, provides 161 hr. of operation of each machine per week, the machines being shut down only 1 hr. a day for lunch. The company is taking some experienced men from the assembly (as its assembly facilities have been developed ahead of machining) to be used as emergency operators in accordance with the attached Schedule No. 1. At the same time it is training men so that all of its vital machines will go on a 7-day week as shown in Schedule No. 2. (See schedules at left).

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	
DAY	A 11 hr.	C 11 hr.	C 11 hr.	A 11 hr.	A 11 hr.	A 11 hr.	A 11 hr.	TIME SPENT RUNNING MACHINE
NIGHT	B 12 hr.	B 12 hr.	B 12 hr.	D 12 hr.	D 12 hr.	B 12 hr.	B 12 hr.	

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	
DAY	C 11 hr.	A 5 hr.		C 11 hr.	C 11 hr.	C 5 hr.		TIME SPENT ON ASSEMBLY OR OTHER MACHINES
NIGHT	D 12 hr.	D 12 hr.	D 12 hr.					

EXPLANATION:-

A- Regular day machine operator

B- Regular night machine operator

C- Regular day assemblyman and emergency machine operator

D- Regular night assemblyman and emergency machine operator

If all above men work 60 hr. per week,
time may be distributed as noted above

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	
DAY	A	X	X	A	A	A	A	MACHINE NO.1
NIGHT	B	B	B	Y	Y	B	B	

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	
DAY	C	C	C	X	X	C	C	MACHINE NO.2
NIGHT	D	Y	Y	D	D	D	D	

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	
DAY	E	E	E	E	E	X	X	MACHINE NO.3
NIGHT	F	F	F	F	F	Y	Y	

EXPLANATION:-

A- Regular day man machine no. 1

C- Regular day man machine no. 2

E- Regular day man machine no. 3

X- Emergency day man

B- Regular night man machine no. 1

D- Regular night man machine no. 2

F- Regular night man machine no. 3

Y- Emergency night man

Monarch Machine Tool To Sublet More Work

Sidney, Ohio

••• January production of the Monarch Machine Tool Co. here is running 50 per cent over that of January, 1940, and will be increased as the year progresses, it is announced by Wendell E. Whipp, president.

Nineteen-forty production of Monarch lathes, Mr. Whipp said, showed an increase of 240 per cent over 1939 output, and the company has a thousand employees today as compared to 648 a year ago.

"Starting Jan. 2," Mr. Whipp said, "we are increasing still further the number of hours during which our equipment is in continuous operation. The plant now runs 22 hours out of every 24, except Sunday. In addition, we plan to subcontract more work to outside plants, and production will also be increased as soon as we receive additional equipment now on order and soon to be delivered.

"Practically the entire output of our plant is going into the defense programs of the United States and England."

At Christmas Monarch paid a bonus to its employees ranging from \$18 to employees who had been with the company for three months or less, to \$120 to employees who had been with the company from 31 to 32 years.

Defense Plants Cost Canada \$280 Millions

• • • Canada's new defense plants, wholly owned by the government and already being built at a cost of \$280,000,000, will produce goods valued at \$800,000,000 in 1941, Angus L. MacDonald, acting Commissioner of Munitions and Supply, announces. (Gross value of the Dominion's pre-war production of manufactured products averaged \$3,600,000,000 yearly.)

Government plant construction under way in Canada falls into the following classifications:

Type of Plant	Cost	% of Total
Shells	\$31,000,000	11
Armaments	96,000,000	35
Air	15,000,000	5
Automotive	6,000,000	2
Explosives and chemicals	87,000,000	31
Machine tools	11,000,000	4
Miscellaneous (*)	34,000,000	12
Total	\$280,000,000	100

(*) Includes financing of nine companies wholly-owned by the government.

Scrap Prices Lifted In United Kingdom

London

• • • In order to meet increased rail charges, maximum prices of iron and steel scrap in the United Kingdom have been raised as from Dec. 9. Part of the advance, states the Ministry of Supply, is to contribute towards additional merchants' costs, and there has also been an adjustment for certain special grades of iron and steel scrap. The Ministry of Supply has issued the Control of Iron and Steel (No. 14) (Scrap) Order, and Direction (No. 1) under the order, to cover the rise. This will supersede previous orders and directions.

Nazis Expel Steel Leaders from France

London

• • • Among prominent French people expelled by Nazi Gauleiter Buerckel from Lorraine are the last members of the De Wendel family, one of the "200 families" which exercised a powerful influence over French policy. M. Francois de Wendel was one of the

six industrialists on the board of regents of the Bank of France before the German invasion.

The important De Wendel steel factories in Lorraine were located along the Franco-Luxemburg frontier, in the Alette Valley and at Thionville. Thousands of workers from these factories have been expelled with their families from Lorraine. The mills have been taken over by the Germans.

120 Naval Vessels to Be Built in Canada

Ottawa

• • • Orders have been placed in Canadian shipyards for another 12 minesweepers for the British Admiralty, according to Angus Macdonald, who, in the absence of Hon. C. D. Howe, is Acting Minister of Munitions and Supply. Six of the ships will be built in North Van yards in Vancouver, and six in the Dufferin Shipyards in Toronto. The total orders placed to date for naval construction now include 70 corvettes and 50 minesweepers.

No Australian Scrap For Non-Empire Nations

London

• • • The Australian Government has prohibited the export of scrap iron and steel to countries outside the British Empire. According to E. J. Harrison, Commonwealth

Minister of Customs, this action has been taken for reasons of Empire defense in order to conserve supplies for future national and imperial needs.

Sales of 8 Machine Tool Companies \$79 Millions

Washington

• • • Covering eight machine tool manufacturing corporations with consolidated sales aggregating \$79,045,896 in 1939 or slightly over 36 per cent of total sales of the machine tool industry in that year, the Federal Trade Commis-

TRAINING FOR DEFENSE

FOR 25 YEARS the Henry Ford Trade School has taught Detroit youths (12 to 15) the industrial arts. Now, with the U. S. apparently threatened as never before, this school is being used as a model for hundreds of others seeking to train skilled workers to man U. S. defense industries. The boys pictured on the following pages live in the Detroit and Dearborn areas, receive cash scholarships of \$375 to \$1,300 yearly.

Coming Events

Jan. 17 to 18—National Slag Association, annual meeting, Birmingham, Ala.

Jan. 27 to 30—American Road Builders Association, annual convention and show, New York.

March 25 to 29—American Society of Tool Engineers, Machine and Tool Progress Exhibit, Detroit.

April 16 to 18—Electrochemical Society, Inc., spring meeting, Cleveland.

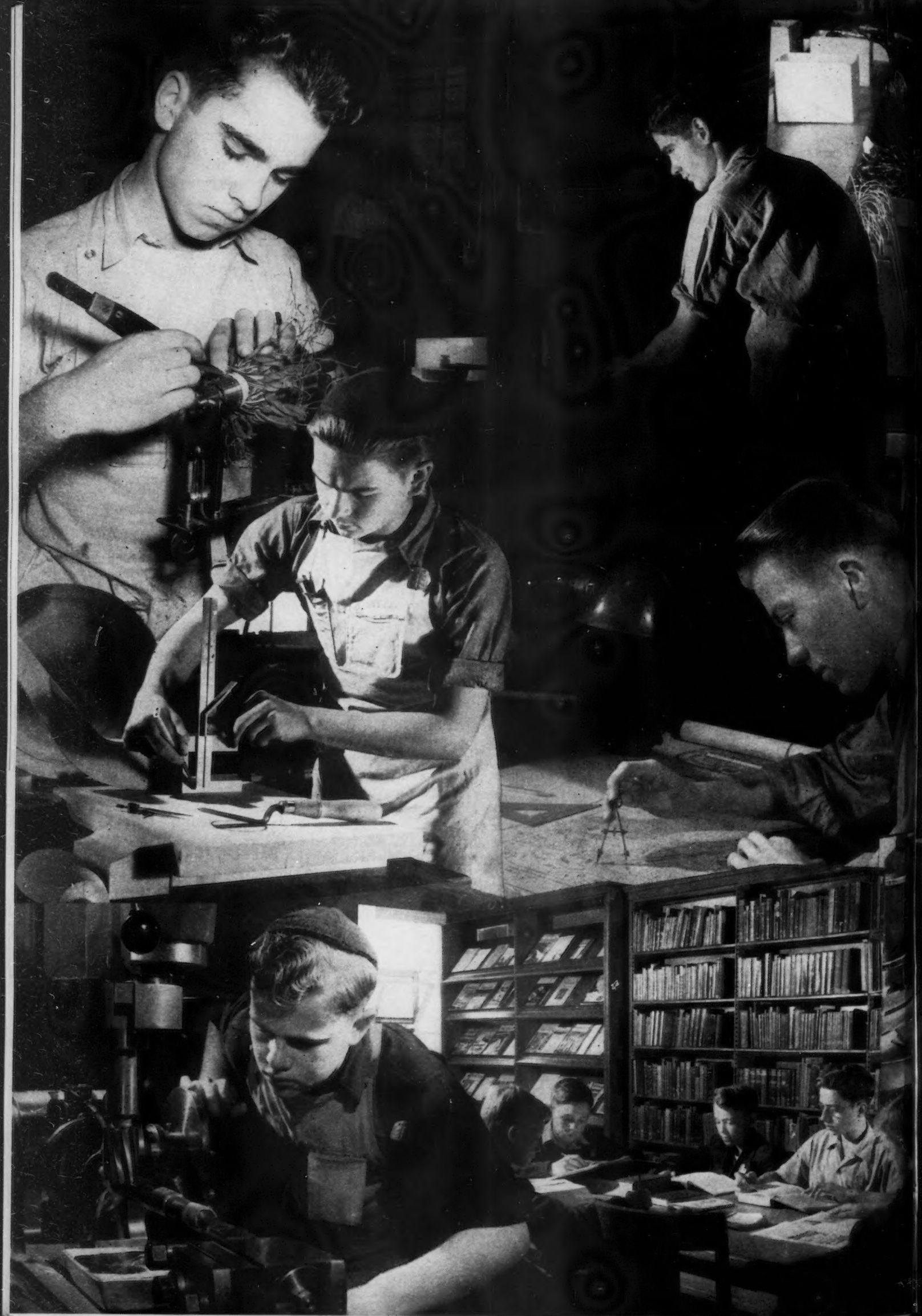
April 23 to 25—Concrete Reinforcing Steel Institute, annual meeting, Hot Springs, Va.

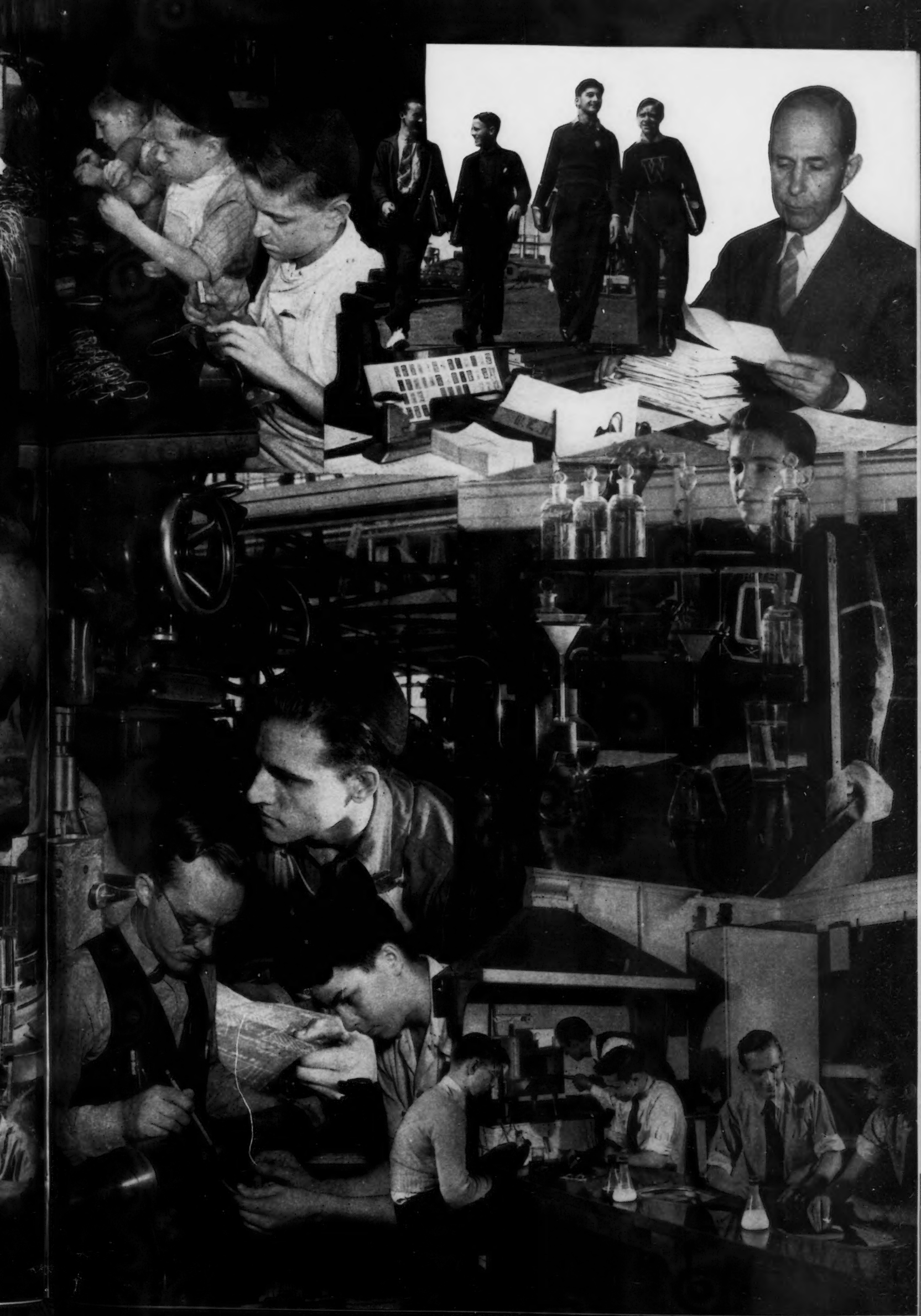
May 5 to 7—American Gear Manufacturers Association, annual convention, Hot Springs, Va.

May 12 to 15—American Foundrymen's Association, annual meeting, New York.

sion in a report says costs of these producers amounted to \$65,424,294. The net income on the average corporate net worth investment, or stockholders' equity, after provisions for income taxes, according to the commission, was \$10,999,718 for 1939, a rate of return of 14.6 per cent of the stockholders investment. The rates for individual corporations were said to have ranged from a loss of 0.6 per cent for one corporation, to a profit of 26.2 per cent.

The cash dividends paid, or accrued, on preferred shares amounted to \$57,754 during 1939, and on the common shares \$6,622,340. These cash dividends represented a return of slightly over 8.8 per cent to the stockholders on the average ledger value (not market value) of their equity of \$75,610,014.





Aluminum Industry Expanded 2 to 5 Times

Washington

••• In his recent statement denying that serious shortages exist in aluminum supplies for aircraft and other military items, Edward R. Stettinius, Jr., commissioner in charge of the Industrial Materials Division, National Defense Advisory Commission, said that reports of shortages appear to have arisen mainly from fear of failure of future deliveries. This fear, the statement said, may be attributable to lack of general under-

facilities for making strong alloy sheet, extrusions, tubing, rolled products and the basic metal in ingot form," the statement said.

"In the last three months forge-hammer capacity has been increased 36 per cent. An additional 94 per cent increase is scheduled to come into operation during January and February. In addition to these hammers, negotiations are now under way with various automobile manufacturers and other producers throughout the country for further additions to hammer capacity.

"Strong alloy sheet mill capacity now roughly 8,000,000 lb. per month, is scheduled to increase to 12,500,000 lb. per month in March, 1941, 15,000,000 lb. per month in August, 1941, and 22,500,000 lb. per month in June, 1942. These increases, resulting from expansion programs of both the Reynolds Metals Co., and the Aluminum Co. of America, are expected to provide a monthly capacity in excess of total monthly requirements, including civilian requirements at 1940 levels. Similar steps are under way to provide adequate capacity for extrusions and other fabricated aluminum items.

"Since September, 1940, total shipments of aluminum materials have been made to aircraft manufacturing companies in amounts considerably in excess of those necessary to meet current totals.

Two 35,000-Ton Ships To Be Ordered in '41

Washington

••• Two Army transports, two 35,000-ton passenger ships and five gasoline tankers will be ordered in 1941 by the Maritime Commission, it was announced last week in a summary of commission activities. The transports and the gasoline tankers will be ordered soon, the commission said. It suggested no date for opening bids on the two 35,000-ton ships, merely indicating that it plans to order two ships.

The 35,000-ton passenger vessels will have stacks on the starboard side for quick conversion into aircraft carriers. A 759-ft. vessel, its speed will be over 24 knots.

During 1940 the ships built or building under some phase of the commission's program reached 179 at a contract price of over \$450,000,000. Of this number, 91 have been launched, 61 delivered, and 24 have been acquired by the Navy. Deliveries are now at the rate of one a week.

The commission reported that American merchant ships are active in the importation of strategic materials, including tin, manganese, chrome ores and bauxite, which it was said, substantially enrich domestic stock piles and contribute to industrial production under the defense program.

TRAINING FOR DEFENSE

FOR 25 YEARS the Henry Ford Trade School has taught Detroit youths (12 to 15) the industrial arts. Now, with the U. S. apparently threatened as never before, this school is being used as a model for hundreds of others seeking to train skilled workers to man U. S. defense industries. The boys pictured on the preceding pages live in the Detroit and Dearborn areas, receive cash scholarships of \$375 to \$1,300 yearly.

standing as to the scope of construction which the defense commission is now in a position to announce as under way.

Mr. Stettinius pointed out that certain delays in delivery of aluminum supplies will doubtless occur under the rapid and unprecedented expansion demanded by the defense effort. New construction, however, it was stated, is under way to increase fabricating facilities sufficiently in advance of plant increases in aircraft production to meet all military requirements.

Details were given of the expansion which will increase capacity in the various branches of the aluminum industry from two to five times that of September, 1940.

"The Aluminum Co. of America, the Reynolds Metals Co., and other fabricators are increasing their

AFL Urges Flexible Agreements on Wages

••• Unions belonging to the AFL were urged this week to insist upon insertion in all new labor contracts of a clause providing for reopening at any time of the wage issue. Said the *American Federationist* (new slick-papered AFL publication): "During the World War living costs soared and wages followed lamely behind."

The publication also carries an article by William Green, AFL president, declaring: "The right to strike is a fundamental and sacred possession of free labor in free countries. This right must be jealously guarded and fully protected in America, not only by labor but by all who regard as indispensable the rights guaranteed to the people in the Constitution."

Commercial Standard for Gage Blanks Adopted

••• A satisfactory majority of manufacturers, distributors and users of gage blanks have given acceptances of a recommended revision of gage blank standards tentatively issued last fall and therefore the standards may be considered effective for new production as of Jan. 1, 1941, and for clearance of existing stocks on Jan. 1, 1942. Mimeographed copies (TS-2985) of the standard, designated as Commercial Standard CS8-41, may be obtained from the chief, division of trade standards, National Bureau of Standards, Washington, upon request. This is the third edition. The first was published in 1930.

These Men Can Tell Small Companies How to Get U. S. Defense Contracts

Alabama

P. L. T. Beavers, Managing Director,
Federal Reserve Bank Branch,
Birmingham.

Arkansas

A. F. Bailey, Managing Director,
Federal Reserve Bank Branch,
Little Rock.

California

H. M. Craft, Assistant Manager,
Federal Reserve Bank Branch,
Los Angeles.
W. M. Hale, Vice-President & Secy.,
Federal Reserve Bank of San Fran-
cisco,
San Francisco.

Colorado

J. E. Olson, Managing Director,
Federal Reserve Bank Branch,
Denver.

Florida

T. A. Lanford, Cashier,
Federal Reserve Bank Branch,
Jacksonville.

Georgia

M. H. Bryan, Vice-President,
Federal Reserve Bank of Atlanta,
Atlanta.

Illinois

A. L. Olson, Asst. Vice-pres. & Asst.
Secy.,
Federal Reserve Bank of Chicago,
Chicago.

Kentucky

C. A. Schacht, Managing Director,
Federal Reserve Bank Branch,
Louisville.

Louisiana

L. M. Clark, Managing Director,
Federal Reserve Bank Branch,
New Orleans.

Maryland

W. R. Milford, Managing Director,
Federal Reserve Bank Branch,
Baltimore.

Massachusetts

E. G. Hult, Assistant Cashier,
Federal Reserve Bank of Boston,
Boston.

Michigan

H. P. Preston, First Vice-President,
Federal Reserve Bank Branch,
Detroit.

Minnesota

H. I. Ziemer, Vice-Pres. & Cashier,
Federal Reserve Bank of Minne-
apolis,
Minneapolis.

Missouri

L. H. Carstarphen, General Counsel,
Federal Reserve Bank of St. Louis,
St. Louis.

The Federal Reserve Bank officers on this page have been designated to assist Donald M. Nelson, Coordinator of Federal Purchases and Director of Small Business Activities for the National Defense Advisory Commission, in providing information to small companies seeking government defense contracts.

C. A. Worthington, First Vice-
President,
Federal Reserve Bank of Kansas
City,
Kansas City.

Montana

R. E. Towle, Managing Director,
Federal Reserve Bank Branch,
Helena.



SWEAT AND SHOWERS—Donald M. Nelson (above), Defense Commission coordinator of Purchases, recently told the U. S. to "shake off its drowsiness and take a cold shower" in arming for defense. Part of Nelson's job is to bring small plants into the defense picture.

Nebraska

L. E. Earhart, Managing Director,
Federal Reserve Bank Branch,
Omaha.

New York

L. R. Rounds, Vice-President,
Federal Reserve Bank of New York,
New York.
R. B. Wiltse, Assistant Manager,
Federal Reserve Bank Branch,
Buffalo.

North Carolina

W. T. Clements, Managing Director,
Federal Reserve Bank Branch,
Charlotte.

Ohio

R. B. Hays, Asst. Vice-Pres. & Sec-
retary,
Federal Reserve Bank of Cleveland,
Cleveland.
B. J. Lazar, Managing Director,
Federal Reserve Bank Branch,
Cincinnati.

Oklahoma

G. H. Pipkin, Managing Director,
Federal Reserve Bank Branch,
Oklahoma City.

Oregon

S. A. MacEachron, Assistant Man-
ager,
Federal Reserve Bank Branch,
Portland.

Pennsylvania

P. A. Brown, Managing Director,
Federal Reserve Bank Branch,
Pittsburgh.
W. J. Davis, Vice-President,
Federal Reserve Bank of Philadel-
phia,
Philadelphia.

Tennessee

J. B. Fort, Jr., Managing Director,
Federal Reserve Bank Branch,
Nashville.
W. H. Glasgow, Managing Director,
Federal Reserve Bank Branch,
Memphis.

Texas

J. L. Hermann, Managing Director,
Federal Reserve Bank Branch,
El Paso.
E. B. Austin, Acting Managing
Director,
Federal Reserve Bank Branch,
San Antonio.
E. B. Stroud, First Vice-Pres. &
General Counsel,
Federal Reserve Bank of Dallas,
Dallas.
W. D. Gentry, Managing Director,
Federal Reserve Bank Branch,
Houston.

Utah

J. M. Leisner, Assistant Manager,
Federal Reserve Bank Branch,
Salt Lake City.

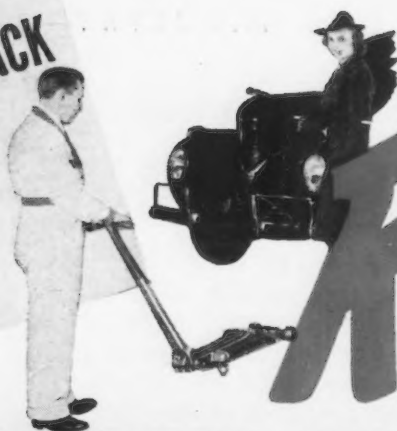
Virginia

R. W. Mercer, Assistant Cashier,
Federal Reserve Bank of Richmond,
Richmond.

Washington

F. C. Bold, Assistant Manager,
Federal Reserve Bank Branch,
Seattle.

READ
HOW WORLD'S LARGEST JACK
MANUFACTURER DOES IT
WITH ALLIS-CHALMERS
TEXROPE!



HOW TO

Return



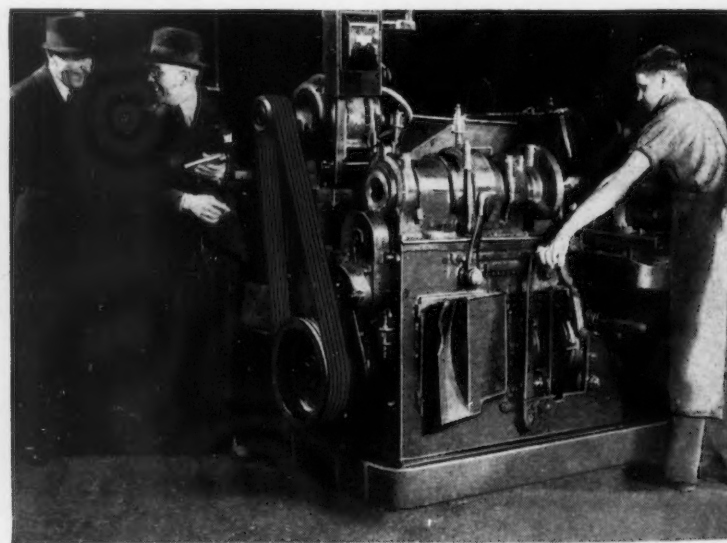
1 **WORLD'S LARGEST JACK-MAKER — THAT'S THE** Walker Mfg. Co., Racine, Wis. Big problem to Walker Foreman, Francis Pfister, is flat belt replacement on automatic screw machines . . . required on an average of every three or four weeks. Since these belts cost \$27 apiece, he calls this problem to the attention of Supt. John E. Jensen, who —



2 **ENLISTS THE HELP OF TEXROPE TRANSMISSION** engineer Roy Bonin. On the battery of 15 automatics, flat belt slippage caused belts to burn, was the primary reason for short belt life. Logical solution is replacement with non-slipping, short-center Texrope Drives for modernization of this vital part of Walker production. So, special Texrope —



3 **RIM SHEAVES ARE ACCURATELY MACHINED IN** the Allis-Chalmers plant, then pressed on original flat pulleys. As a result, expensive clutch drums inside the flat pulleys need not be duplicated for the V-belt replacements. With minimum production interruption, screw machines are stopped one at a time, pulleys sent to Allis-Chalmers. Soon after —



4 **TEXROPE-EQUIPPED PULLEYS ARE RETURNED** to the Walker plant, where Supt. Jensen enthusiastically inspects advantages of Texrope V-belt transmission applied to his machines. Now matched sets of genuine, short-centered Texrope belts make these automatics more compact, more efficient, give operators more accurate control. What's more —

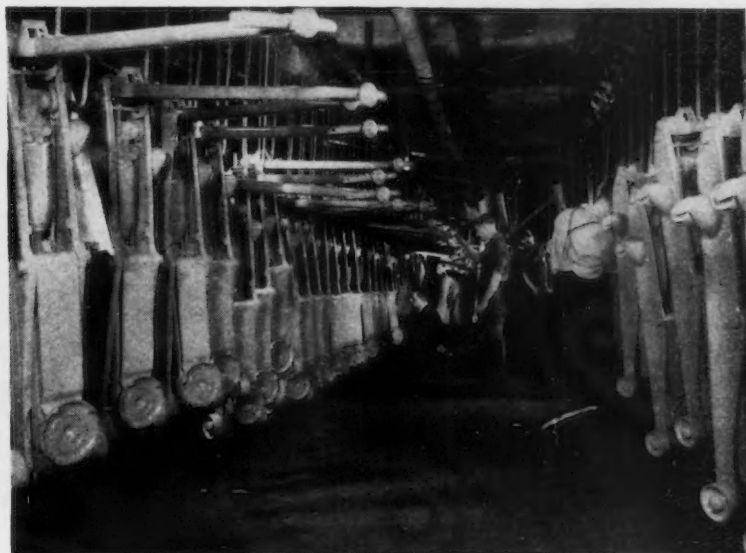


TEXROPE DRIVES CUT

INVEST \$645 AND GET A of \$10,000 in Two Years!



5 INSTEAD OF PAYING \$27 PER BELT EVERY three weeks, Foreman Pfister graphically reports original Texrope belts are completing two years operation . . . *without a single replacement!* Costing initially \$43 per unit, these changeovers paid for themselves in less than two months . . . *have saved an estimated \$10,000 in belt replacements since!*



6 WELCOME, THEN, TO WALKER PRODUCTION men, is the money-saving story of modern Texrope V-belt transmission. Performance is Texrope's ace salesman . . . and, not only at Walker, but throughout industry in hundreds of varied applications, Texrope is solving many difficult problems, bringing low-cost transmission wherever it is applied!



Here's How You Can Jack-Up Lagging Production Schedules . . . with Allis-Chalmers Texrope! Get the Story of Texrope Co-

operative Engineering Service and What it Means to You in Dollars and Cents Savings!

There's more to a drive than just sheaves and belts! That's why . . . before Allis-Chalmers sells a drive, a highly skilled Texrope transmission engineer analyzes your problem . . . figures the kind of drive or transmission equipment that will give you the highest standard of performance and save you dollars at the same time!

What's more . . . you get this valuable *extra-value* feature . . . this *money-saving* co-operative service . . . at no extra cost!

No wonder production men in a world of industries make Texrope their first choice . . . call on Texrope for the high degree of money-saving performance only a precision engineered drive can give them!

So get Texrope . . . and get ahead of transmission troubles! Call your nearest Allis-Chalmers district office or Texrope Dealer for the whole story of Texrope's co-operative engineering service!

A 1315

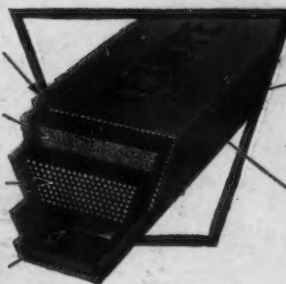
WHEN ORDERING REPLACEMENTS, REMEMBER . . . ONLY TEXROPE V-BELTS GIVE YOU ALL THESE OUTSTANDING FEATURES!

Extra-tough, two-ply cover gives EXTRA-PROTECTION against abrasive wear . . . eliminates need for belt dressing of any kind.

Special bias cut fabric adds transverse strength . . . provides DOUBLE SAFETY against belt breakage.

Rugged load-carrying cords, impregnated in a special, cool-flexing gum insure unvarying length . . . GREATER strength . . . MORE pulling power.

Amazing cool-running rubber compound absorbs shock . . . assures silent, vibrationless operation . . . ACTUALLY INCREASES BELT LIFE 100 TO 200% OVER BELTS OF ONLY A FEW YEARS AGO!



Texropes are TRUE V-BELTS . . . with famous STRAIGHT-EDGE WEDGE design that gives efficiencies up to 98.9% . . . prevents slipping, jerking. Because they are matched in a special precision measuring machine, sets of Texropes are uniform to a fraction of an inch in length — your guarantee of equalized pulling . . . even wear . . . longer life.

LOOK for the name TEXROPE . . . stamped on every belt! It identifies the only GENUINE Texrope . . . backed by Allis-Chalmers, originators of the multiple V-belt drive. You can get genuine Texropes and Texrope Drives instantly from Allis-Chalmers warehouses and distributor stocks throughout the world.

Belts by Goodrich

T TRANSMISSION COSTS

Defense Manpower Groups Organized

Pittsburgh

••• Small industrial concerns with national defense contracts now have available to them expert industrial relation personnel equipped to set up safety and health programs in these plants. Large companies with national defense work may also obtain advice and help on these matters as needed. This is made possible through a National Committee for the Conservation of Manpower in Defense Industries appointed by the Secretary of Labor, which has been established by the government to further the national defense program through the control of work disabilities which cause interruptions to production and impede deliveries.

The State committee covering Western Pennsylvania has already been organized, with Ross L. Lefler, Carnegie-Illinois Steel Corp., as chairman. Other members are: Clarence E. Ralston, Pittsburgh Plate Glass Co.; Gerard O. Griffin, Dravo Corp., Pittsburgh; N. V. B. Ziegler, Aluminum Co. of America; Victor O. Will, Mesta Machine Co.; T. Lyle Hazlett, M.D., Westinghouse Electric & Mfg. Co.; and John A. Oartel, Western Penna. Safety Council.

A Technical Advisory Committee has been formed to aid in industrial hygiene and prevention of occupational diseases. Members of this committee in Western Pennsylvania are: Chairman, Dr. W. S. McElroy, University of Pittsburgh; Dr. Samuel R. Haythorn, Singer Memorial Laboratory; Dr. Frederick M. Jacob, Allegheny County Medical Society; Dr. C. Howard Marcy, Tuberculosis League Hospital; Dr. H. B. Meller, Air Hygiene Foundation; Dr. J. B. McConaughy, Aluminum Co. of America; Dr. N. H. Schrenk, U. S. Bureau of Mines; and William P. Yant, Mine Safety Appliance Co.

The setup also includes a General Advisory Committee which will advise on engineering problems, labor and personnel relations, etc.: Roy McKenna, Vanadium-Alloy Steel Co.; Ray Booth, Tri-State Employers Association; Dana Jones, Manufacturers Association; Roy A. MacGregor, Con-



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Gain of 34.9% Seen In Steel Carloading

Washington

••• Iron and steel shipments during the first quarter of 1941 are estimated by the 13 Shippers' Advisory Boards at 527,785 carloads, an increase of 34.9 per cent over shipments of 391,386 carloads during the last quarter of 1940.

Estimate of the board, released by the Association of American Railroads, places the total first quarter carloadings at 5,572,106, an increase of 9.5 per cent over 1940 last quarter's carloadings of 5,089,820.

structors Association of Western Penna.; W. H. Wade, Pennsylvania Edison Co.; R. H. Flinn, Pennsylvania Railroad, and Hon. Lewis G. Hines, Department of Labor and Industry. In addition to these major committees, each county in Pennsylvania will have an advisory committee.

New Type Sub-Machine Gun Being Manufactured

Worcester, Mass.

••• Production is now under way on a new sub-machine gun capable of the fire power and effectiveness of existing accepted military type but weighing 50 per cent less and costing approximately 60 per cent less, Joseph P. Carney, president of Harrington & Richardson Arms Co., manufacturers of the weapon, announces.

The H&R sub-machine gun will be manufactured by mass production methods previously considered impossible for an arm of this kind, according to Carney's statement. Production on equipment already set up in the H&R plant will reach 500 a day by Feb. 1, 1,000 a day by April 1, if present expectations are realized. The gun, firing 600 shots a minute, weighs 6½ lb.

U. S. Electrical Motors Opens Plant at Milford

••• U. S. Electrical Motors, Inc., has opened a new \$500,000 plant in Old Gate Lane, Milford, Conn. President of the company is H. G. Steele. The plant will manufacture one-fourth to 50 hp. motors for industrial and agricultural uses.

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Fluoride
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In bulk



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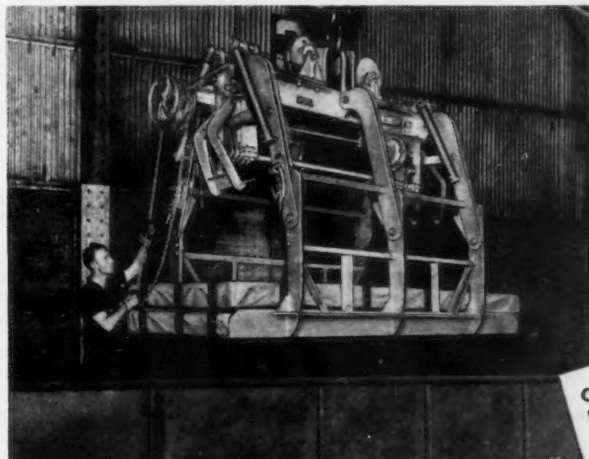
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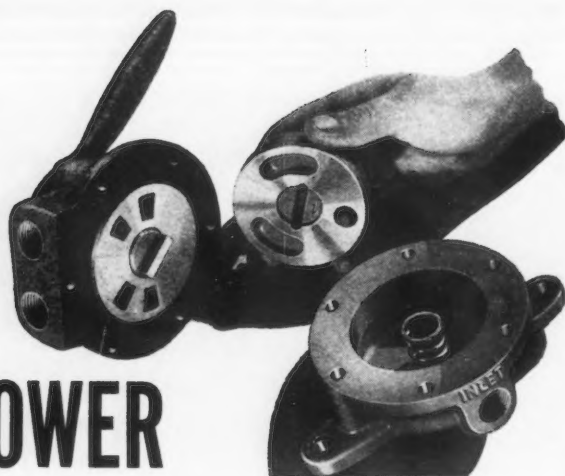
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\$7 Million Pay Raise For Railroad Workers

Washington

••• Wage increases totaling \$7,000,000 for some 70,000 railroad workers is expected by the Labor Department's wage-hour division when minimum rates of 36c. an hour for employees of trunk lines and 33c. for employees of short lines become effective March 1.

Wage-Hour Administrator Philip B. Fleming claimed that the wage rates represent the third largest increase to be ordered under the Fair Labor Standards Act.

British Coke May Be Used at Pittsburgh

Pittsburgh

••• British coke may soon be used at furnaces somewhat removed from eastern seaboard, because of the growing domestic scarcity, according to C. S. B. Ward, president of the Wieman & Ward Co., Pittsburgh.

"Under present conditions," said Mr. Ward, "British exporters can lay coke down at seaboard at a cost equal to American delivered prices. If domestic prices continue to advance, due to demands for national defense purposes, large coke users in desperation are likely to absorb the freight rates from seaboard to this district."

Course Offered in Industrial Journalism

••• A course in Engineering Journalism will be added to those offered by the College of Engineering at Cornell University, beginning with the second term, Dean S. C. Hollister has announced. This innovation is designed to give technical instruction both in editorial procedures and in business methods to members of the staff of the Cornell Engineer.

Assistant Professor R. Y. Thatcher of the School of Civil Engineering will be in charge of the business management section. To teach the editorial section, Dean Hollister has appointed Raymond F. Howes instructor in engineering journalism.

Fabricated Steel Orders Below 1939

New York

••• Orders booked by the fabricated structural steel industry during 1940 will probably not exceed a total of 1,700,000 tons despite the recent increase in business resulting from the national defense program, the American Institute of Steel Construction reports. This compares with 1,305,049 tons booked in 1939 and 3,597,825 tons booked in 1929. The capacity of the industry has changed but little since 1929. Some shops have been closed and other have been absorbed, but the shops remaining have, in many instances, extended their capacities in order to effect economies in production and for other reasons. Therefore the volume of business booked in 1940 will not tax the physical capacity or the man-power capacity of the industry.

The institute believes the demands on the industry will not appreciably increase during 1941, and adds: "Defense contracts, as pointed out by officials of the National Defense Commission, are now about 80 per cent let. A fair volume of this business will continue for probably the next six months, but unless there are unforeseen circumstances, this will be in the nature of a rounding out of the national needs. As the defense industries get into production new needs will doubtless arise, as in the nature of utilities, public buildings, bridges, etc. Such business, however, is not likely to be of any considerable volume and it can hardly be counted upon to take up the slack which might result after the defense construction work is completed next spring and summer.

"The fabricated structural steel industry, therefore, realizes that it must look to other and new fields for business after next summer if its present rate of operations is to continue. In the first World War these shops found a useful place in supplying war needs. Many phases of munitions production were subtle to the members of the industry. Among other things produced in the structural steel fabricating shops were: parts for pontoon bridges; barges; fabri-

Structural Shapes Cut from 267 to 70

Ottawa

••• Canadian mills have been instructed by the Canadian steel controller to reduce by virtually 75 per cent the number of standard steel shapes rolled for the structural steel fabricating industry, according to Angus L. Macdonald, Acting Minister of Munitions and Supply. This action, part of a general program to conserve and augment Canada's supply of steel, is a first step toward a reduction and simplification of steel shapes and steel products used throughout industry in general.

H. D. Scully, steel controller and chairman of the Wartime Industries Control Board, said the limitation of the number of standard shapes rolled for the structural steel fabricating industry will reduce delays in the production of steel caused by frequent changes in the type of product rolled, and will thus augment production and so bring the rolling capacity of the Dominion up to the melting capacity of the furnaces. According to instructions issued by the steel controller, the number of standard structural shapes has now been reduced from 267 to 70. These cover I beams, H beams, channels, and angles.

cated ships and parts thereof; hangars; frames for tractors and trucks made of structural shapes; frames for anti-aircraft guns, railway guns, artillery, etc.; gun mounts; bodies for tanks; alumi-


num amphibian tank hulls; cranes, crane runways; field kitchens; jail equipment; ammunition depots; ammunition boxes, cases or containers, ejected case and ejector link, etc.; posts for shot trucks; light armor plates for ambulances, airplanes, etc.; armor plates for tanks; bomb shelters; transmission line poles; beacon towers, trench plates.

"Probably the most notable contribution to the war effort of 1916 and 1917 on the part of the structural steel fabricators was in merchant shipbuilding. In standardizing the types and sizes of the merchant ships then built it was found cheaper and quicker to fabricate most parts in shops away from the yard and assemble them on the ship ways. Whether that system will be required today depends entirely upon the emergency developed, but under any circumstance it is believed many parts of a ship can well be produced in structural shops and thereby expedite the production of merchant tonnage."

\$7,000,000 Plant Expansion For Consolidated Aircraft

San Diego, Cal.

••• Consolidated Aircraft Corp. will soon start a seven million dollar plant expansion program here which includes eight new buildings, expected to double present manufacturing space.

	Milwaukee, Wis., <u>Nov. 22</u> 1940
	This is to Certify that
	<u>JOHN DOE</u>
	<u>John Doe</u> (Employee's Signature)
	whose signature appears hereon is an American citizen and a bona fide employee of
	<u>RICHARD ROE CO</u> (Employer)
	By <u>Richard Roe Jr. pres.</u>

IDENTIFICATION CARDS like this are being carried by persons who pass frequently through gates of Milwaukee plants filling defense orders. This plan to prevent sabotage was started by the Milwaukee Chamber of Commerce.



FIRST LARGE-SCALE sub-contracting of airplane parts to the automotive industry has been started by Douglas Aircraft Co., Santa Monica, Cal. Planes similar to the Douglas A-20A attack bombers pictured here will be assembled from the stampings. Approximately \$100,000,000 of such contracts have been placed, chiefly in the Midwest. The photograph shows fairings of the engine nacelles into the wings of the bombers.

Government Awards

Government awards during the week ended Dec. 21 according to the Division of Public Contracts, Department of Labor, are as follows:

Iron and Steel Products:

Acheson Mfg. Co., Rankin, Pa.; pipe flanges	\$14,802
Aluminum Co. of America, Washington; forgings	17,690
Aluminum Cooking Utensil Co., New Kensington, Pa.; steam kettles	80,021
American Car & Foundry Co., New York; burster links	10,806
Babcock & Wilcox Tube Co., Beaver Falls, Pa.; boiler tubes ..	96,307
Baldt Anchor, Chain & Forge Corp., Chester, Pa.; anchor chain ..	71,957
Bethlehem Steel Co., Bethlehem, Pa.; projectiles	50,000
Bethlehem Steel Co., Bethlehem, Pa.; forgings	11,890
Black & Decker Mfg. Co., Towson, Md.; motor maintenance equipment	14,208
Budd Wheel Co., Detroit; shell ..	1,419,000
Budd Wheel Co., Detroit; shell ..	1,582,680
Carnegie-Illinois Steel Corp., Washington; nickel, steel	44,905
Wm. H. Cole & Sons, Baltimore; screw drivers	Indefinite
Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.; pistols	1,014,869
Consolidated Steel Warehouse Co., Philadelphia; channels	12,025
Crane Co., San Francisco; valves ..	18,378
Crane Co., Washington; lavatories, seats	13,606
Crown Can Co., of Crown Cork & Seal Co., Inc., Philadelphia; chem. container	558,950
Crucible Steel Co. of America, New York; bar steel	150,800
Henry Disston & Sons, Inc., Philadelphia; files	43,676
Henry Disston & Sons, Inc., Philadelphia; armor plate	51,249
Electro Metallurgical Sales Corp., New York; ferro metals	88,112
Ellicott Machine Corp., Baltimore; latches	51,900
General Bronze Corp., Chicago; steel bridge	51,500
H. S. Getty & Co., Inc., Philadelphia; handles, hinges, knobs ..	11,105
Hadley Special Tool Co., Inc., Boston; gun parts	22,858
Harrisburg Steel Corp., Harrisburg, Pa.; gas cylinders	54,070
Hunter Steel Co., Pittsburgh; gates ..	107,930
Inland Steel Co., Chicago; bar steel ..	150,800
International-Stacey Corp., Columbus, Ohio; marker buoys	34,437
H. L. Judd Co., New York; brass bolts	10,080
Lalanc & Grosjean Mfg. Co., Washington; egg whip, colander ..	13,222
Lalanc & Grosjean Mfg. Co., Woodhaven N. Y.; double boiler ..	58,191
Lynchburg Foundry Co., Lynchburg, Va.; water pipe	12,544
McCambridge Co., Philadelphia; lavatories	15,604
Milwaukee Stamping Co., Milwaukee; container assys.	356,360
Moltrup Steel Products Co., Beaver Falls, Pa.; engraving plates ..	16,674
Molybdenum Corp. of America, Washington, Pa.; ferro metals ..	79,458
Moto-Scout Mfg. Co., Chicago; rails ..	80,119
Murray Iron Works, Burlington, Iowa; boilers	67,809
Nashville Bridge Co., Nashville, Tenn.; steel towers	18,190
National Pneumatic Co., New York; shells	54,468
New Method Steel Stamps, Inc., Detroit; figures and letters	38,386
Nicholson File Co., Providence, R. I.; files, rasps	169,532

Noland Co., Inc., Washington; steel pipe	66,525
North American Iron & Steel Co., Inc., Brooklyn; searchlight towers ..	22,845
Oliver Iron & Steel Corp., Pittsburgh; steel nuts	23,010
Pacific Wire Rope Co., Los Angeles; wire rope	36,883
Peck, Stow & Wilcox Co., South- ington, Conn.; braces	15,134
Phila. Hardware & Malleable Iron Works, Inc., Philadelphia; thumb nuts	15,180
Pittsburgh Screw & Bolt Corp., Pittsburgh; tap rivets	261,280
Pittsburgh Steel Co., Pittsburgh; steel tubing	30,390
Pressed Steel Tank Co., West Allis, Wis.; cases	150,366
Reeves Steel & Mfg. Co., Dover, Ohio; galvanized cans	14,889
John A. Roebling's Sons Co., Trenton, N. J.; steel thimbles	16,001
Sargent & Co., New Haven, Conn.; pulls, hooks, handles	11,800
Talon, Inc., Meadville, Pa.; slide fasteners	95,674
Timken-Detroit Axle Co., Detroit; forgings	52,466
Tredegear Co., Richmond, Va.; projectiles	45,652
Union Wire Rope Corp., Kansas City, Mo.; wire rope	49,393
United-Carr Fastener Corp., Cambridge, Mass.; buttons and washers ..	10,393
United States Pipe & Foundry Co., Philadelphia; water pipe	61,427
United States Steel Export Co., Washington; reinforcing steel ..	53,418
United States Steel Export Co., Washington; shapes, billets	30,064
Upson-Walton Co., Cleveland; wire rope	40,743
Upson-Walton Co., Cleveland; steel cable	12,420
Upson-Walton Co., Cleveland; anchor shackles	34,871
Vanadium Corp. of America, New York; ferro metals	24,085
Vulcan Mold & Iron Co., Latrobe, Pa.; chill molds	25,561
Waterbury Buckle Co., Waterbury, Conn.; buckles	10,220
J. H. Williams & Co., Buffalo, N. Y.; wrenches	18,810
Wire Rope Corp. of America, Inc., New Haven, Conn.; wire rope ..	99,324
Wire Rope Mfg. & Equip. Co., Seattle, Wash.; wire rope	20,629
J. Wiss & Sons Co., Newark, N. J.; shears	11,891
Youngstown Sheet & Tube Co., Youngstown, Ohio; bar steel ..	150,800

Other Machinery:

Ajax Mfg. Co., Cleveland; forging machine	\$16,600
Alban Tractor Co., Baltimore; shovel	341,066
Aldrich Pump Co., Allentown, Pa.; pumps	21,222
American Hoist & Derrick Co., St. Paul; snatch blocks	13,995
American Laundry Machine Co., Cincinnati; laundry equipment ..	2,596,123
American Tool Works Co., Cincinnati; radial drills	32,550
Austin-Hastings Co., Inc., Cambridge, Mass.; saw machines ..	13,781
Axelson Mfg. Co., Los Angeles; lathes	14,737
Baker Hamilton & Pacific Co., San Francisco; scrapers	10,942
Bay City Shovels, Inc., Bay City, Mich.; power shovel	14,000

L. A. Benson Co., Inc., Baltimore; twist drills	46,481
Bertsch & Co., Cambridge City, Ind.; bending roll	22,513
Braun Gear Corp., Brooklyn; gears ..	95,329
Brown & Sharpe Mfg. Co., Providence, R. I.; grinders	47,130
Busch-Sulzer Bros. Diesel Eng. Co., St. Louis; diesel gen. unit..	97,974
Caterpillar Tractor Co., Peoria, Ill.; tractors	13,348
Chambersburg Engineering Co., Chambersburg, Pa.; forging hammer	11,500
Chicago Pneumatic Tool Co., Philadelphia; drills	12,680
Cincinnati Electric Tool Co., Cincinnati; buffers, grinders	75,648
Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati, Ohio; milling machines ..	32,327
Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati; grinding machine	27,440
Cleveland Twist Drill Co., Cleveland; twist drills	15,570
Consolidated Machine Tool Corp., Rochester, N. Y.; boring mill ..	215,600
Danna Tool-D Nast Machine Co., Philadelphia; drill chucks	10,158
Dayton Type, Inc., Dayton, Ohio; jig and fixture assembly	12,175
Ekstrom, Carlson & Co., Rockford, Ill.; tools, jigs	20,056
Fairbanks Morse & Co., New York; engine spares	11,492
Foot-Burt Co., Cleveland; broaching machines	23,710
Frick Co., Inc., Waynesboro, Pa.; condens. and refrig.	22,490
Ed. Friedrich Sales Corp., San Antonio, Texas; refrigerators	51,050
George J. Fritz Foundry & Machine Co., St. Louis; rings	26,002
C. C. Galbraith & Son, Inc., New York; winches, davits	11,833
General Machine Corp., Hamilton, Ohio; engine lathes	130,260
General Motors Corp., Cleveland Diesel Engine Division, Cleveland; engine parts	10,820
A. J. Glesener Co., San Francisco; twist drills	19,159
Heald Machine Co., Worcester, Mass.; grinders	29,463
Hendey Machine Co., Torrington, Conn.; lathes	38,568
Clinton E. Hobbs Co., Everett, Mass.; chain hoists	21,565
Hodgson Foundry Co., Chicago; rings	13,311
Homelite Corp., Port Chester, N. Y.; generators	12,380
Hyde Windlass Co., Bath, Maine; windlasses	58,000
Ingersoll-Rand Co., Washington; nail drivers	109,950
Ingersoll - Rand Co., Knoxville, Tenn.; food pumps	75,138
Kearney & Trecker Corp., Milwaukee; milling machines	337,898
E. A. Kensey Co., Cincinnati; lathes	190,524
E. A. Kinsey Co., Cincinnati; nibbling machines	47,904
E. A. Kinsey Co., Cincinnati; milling machines	129,597
Levene Motor Co., Philadelphia; engine parts	14,625
Lloyd & Arms, Inc., Philadelphia; grinders	77,808
Lodge & Shipley Machine Tool Co., Cincinnati; lathes, engine	77,325
Edward A. Lynch Machine Co., Philadelphia; drilling machs. ..	15,113
Mall Tool Co., Chicago; drills	26,737
Manning, Maxwell & Moore, Inc., Jersey City, N. J.; twist drills ..	38,559
Mattison Machine Works, Rockford, Ill.; grinder	27,377
Milwaukee Electric Tool Corp., Milwaukee; elec. drills	53,011
Lucian Q. Moffit, Inc., Akron, Ohio; bearings	24,012

GOVERNMENT AWARDS

Morse Chain Co., Detroit; engine parts	11,309
Motch & Merryweather Machine Co., Cleveland; milling machines	28,757
Motor Tool Mfg. Co., Detroit; tools, jigs	42,319
Noland Co., Inc., Washington; twist drills	12,095
Norman Supply Co., Inc., Norfolk, Va.; drills	16,848
Pacific Marine Supply Co., Seattle; pumps	16,968
Pangborn Corp., Hagerstown, Md.; sand blast equipment	17,789
Pratt & Whitney Division, Niles-Bement-Pond Co., West Hartford, Conn.; radial drills	12,035
Pratt & Whitney Division, Niles-Bement-Pond Co., West Hartford, Conn.; reaming machine	16,716
Pratt & Whitney Division, Niles-Bement-Pond Co., West Hartford, Conn.; shapers	10,684
Henry Prentiss & Co., Inc., New York; boring machine	92,522
Seifreut-Elstad Machine Co., Dayton, Ohio; milling machines	256,063
Seifreut-Elstad Machine Co., Dayton, Ohio; kapping machines	28,670
H. A. Smith Machine Co., Syracuse, N. Y.; lathes	12,015
Star Drilling Machine Co., Akron, Ohio; drilling machine	26,231
Tidewater Supply Co., Inc., Norfolk, Va.; boring machines	167,127
Towmotor Company, Cleveland; tractors	10,206
Turbine Equipment Co., New York; oil reclaiming sys.	14,492
Union Drawn Steel Division, Republic Steel Corp., Massillon, Ohio; bar steel	53,675
United States Electric Tool Co., Cincinnati; grinders	82,021
United States Hoffman Machine Corp., New York; laundry equip.	873,315
Warner & Swasey Co., Cleveland; turret lathe	19,586
Watson-Stillman Co., Roselle, N. J.; bending machine	11,775
Weatherby Machine Co., Seattle; drills	12,840
John Wood Mfg. Co., Inc., Muskegon, Mich.; recoil mech.	169,250
Worthington Pump & Machine Corp., New York; hydraulic pump	15,972

Nonferrous Metals and Alloys

Aluminum Co. of America, Washington; aluminum alloy ingot ..	\$11,400
American Brass Co., Waterbury, Conn.; copper-nickel alloy	11,346
American Brass Co., Waterbury, Conn.; rotating bands	43,259
American Brass Co., Waterbury, Conn.; brass	24,475
American Metal Co., Ltd., New York; pig tin	101,243
American Smelting & Refining Co., Denver, Colo.; copper	10,040
Belmont Smelting & Refining Works, Inc., Brooklyn; ingot copper	13,110
Bohn Aluminum & Brass Corp., Detroit; brass forgings	117,685
Bulova Watch Co., New York; fuse parts	11,026
Caswell, Strauss & Co., Inc., New York; pig tin	101,908
Chase Brass & Copper Co., Inc., Waterbury, Conn.; condenser tubes	24,543
Chase Brass & Copper Co., Inc., Waterbury, Conn.; brass	19,572
Chase Brass & Copper Co., Inc., Waterbury, Conn.; cartridge cups	95,625
Dollin Corp., Irvington, N. J.; booster cups	44,280
Duquesne Smelting Corp., Pittsburgh; bearing bronze	11,212
Emerson Elec. Mfg. Co., St. Louis; boosters	822,232

Canada Sees Million Ton Steel Shortage

Ottawa

•••The steel controller of Canada has advised manufacturers to find substitutes for steel in products which are not required for war needs, and at the same time has warned industry that no excess purchasing or over-stocking will be tolerated.

The actual bottleneck in Canada's steel industry lies in the rolling capacity of the Dominion rather than in any shortage of pig iron output from the blast furnaces or in any shortage of scrap, according to the Department of Munitions and Supply. Hence, the apparent shortage next year of 1,000,000 tons of steel, will have to be offset principally by imports. The restrictions placed by the U. S. on the types of steel exported to this country will thus naturally determine what further steps may be taken to curtail domestic consumption and to divert steel to war needs.

Federal Screw Works, Detroit; booster	2,298,000
Federal Tin Co., Baltimore, Md.; grommet, binder	62,813
Illinois Zinc Co., New York; ribbon zinc	13,387
Walter Kidde & Co., Inc., New York; fire extinguishing outfits	40,892
National Pneumatic Co., New York; booster parts	783,080
North American Smelting Co., Philadelphia; anti-friction metal	13,796
Oneida, Ltd., Oneida, N. Y.; fork, knife, spoon	11,855
Revere Copper & Brass, Inc., Baltimore Division, Baltimore; condenser tubes	34,976
Revere Copper & Brass, Inc., Baltimore Division, Baltimore; copper-nickel-alloy	54,134
Revere Copper & Brass, Inc., Baltimore, Md.; anodes, hooks	24,255
Revere Copper & Brass, Inc., Rome Mfg. Co. Division, Rome, N. Y.; brass stops	75,024
Robertshaw Thermostat Co., Youngwood, Pa.; booster parts	1,493,100
Scovill Mfg. Co., Waterbury, Conn.; cartridge cups	96,000
Thorrez & Maes Mfg. Co., Jackson, Mich.; liner assays	21,250
United Wire & Supply Corp., Cranston, R. I.; brazing alloy ..	18,406

Navy Department:

Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel, corrosion-resisting	\$26,756
Aluminum Co. of America, Washington, D. C.; aluminum and aluminum alloy	109,169
Aluminum Cooking Utensil Co., New Kensington, Pa.; aluminumware	56,311
Aluminum Goods Mfg. Co., Manitowoc, Wis.; aluminumware ..	81,320
Aluminum Products Co., La Grange, Ill.; aluminumware ..	158,896

Austin-Hastings Co., Inc., Cambridge, Mass.; planer and shaper, openside	6,506
Autocar Co., Washington, D. C.; trucks, tractor, and semi-trailers	36,630
Carnegie-Illinois Steel Corp., Washington, D. C.; steel, corrosion-resisting	12,809
Carpenter Steel Co., Reading, Pa.; steel, corrosion-resisting	14,330
Caswell, Strauss & Co., Inc., New York; tin, pig	411,931
Fruehauf Trailer Co., Detroit; trailers	58,374
General Motors Corp., Chevrolet Div., Detroit, Mich.; trucks, motor	6,324
General Time Instruments Corp., Thomaston, Conn.; clocks, boat	92,217
Gisholt Machine Co., Madison, Wis.; lathes, turret	20,585
Hendey Machine Co., Torrington, Conn.; shapers, horizontal, high speed	8,464
Herring-Hall-Marvin Safe Co., Hamilton, Ohio; safes, burglar resisting	16,593
Intertype Corp., Brooklyn, N. Y.; machine, typesetting	5,296
Keystone Drawn Steel Co., Spring City, Pa.; steel, cold-rolled	6,010
Lodge & Shipley Machine Tool Co., Cincinnati; lathes, engine	13,521
MacLan Hardware Co., New York; nippers, end cutting	9,149
Northill Co., Inc., Glendale, Cal.; shears, power operated	15,281
Rustless Iron & Steel Corp., Baltimore, Md.; steel, corrosion-resisting	38,632
Swartzbaugh Mfg. Co., Toledo, Ohio; aluminumware	34,669
Vanadium Corp. of America, New York, N. Y.; ferrosilicon	5,752
Youngstown Sheet & Tube Co., Youngstown, Ohio; steel, nickel ..	18,848

PUBLIC CONTRACTS DIVISION, DEPARTMENT OF LABOR announces the following Government Awards for the week ended Dec. 28.

Iron and Steel Products:

American Locomotive Co., Railway Steel-Spring Division, New York; rod springs	\$25,782
Babcock & Wilcox Co., New York; boilers	181,349
Bay State Tool & Machine Co., Springfield, Mass.; rifle parts ..	26,982
Benn Supply Co., Jersey City, N. J.; steel pipe	12,613
Bethlehem Steel Export Corp., New York; switches	19,014
Budd Wheel Co., Detroit; shell ..	2,415,000
Crane Company, Washington; steam valves	40,013
Duplex Mfg. Corp., Sherman, N. Y.; steel chests	13,879
Gilbert & Barker Mfg. Co., Springfield, Mass.; bushings	13,906
Gilbert & Barker Mfg. Co., Springfield, Mass.; water chests	173,390
Great Eastern Construction Co., Inc., New York; steel buildings ..	19,935
Heller Brothers Co., Newark, N. J.; files	14,442
Joshua Hendy Iron Works, San Francisco; seal gate ring	28,638
Linde Air Products Co., New York; torches	17,004
MacWhyte Co., Kenosha, Wis.; steel cable	81,810
Munkel Heating Co., Columbus, Ohio; furnaces	10,067
National Forge & Ordnance Co., Washington; crankshafts	12,250
National Supply Co., Spang Chalfant Division, Ambridge, Pa.; forging	1,221,500
National Tube Co., Washington; boiler tubes	57,722

GOVERNMENT AWARDS

North & Judd Mfg. Co., New Britain, Conn.; slides, clasps	32,003
Oliver Farm Equipment Co., Springfield Ohio Division, Springfield, Ohio; projectors	13,086
Pettibone-Mulliken Corp., Chicago; steel frogs	15,865
G. E. Prentice Mfg. Co., New Britain, Conn.; fasteners	26,445
Republic Steel Corp., Cleveland; blanks	95,513
Republic Steel Corp., Alloy Steel Division, Massillon, Ohio; alloy steel	11,489
John A. Roebling's Sons Co., Trenton, N. J.; steel wire	13,333
Joseph T. Ryerson & Son, Inc., Jersey City, N. J.; reinforcing steel	10,869
Sheffield Steel Corp., Kansas City, Mo.; reinforcement bars	20,055
J. Stevens Arms Co., Division Savage Arms Corp., Chicopee Falls, Mass.; shotguns	42,100
Struthers Wells-Titusville Corp., Titusville-Forge Division, Titusville, Pa.; forgings	238,306
Timken Roller Bearing Co., Steel & Tube Division, Canton, Ohio; steel, nickel	38,661
Truscon Steel Co., San Antonio, Texas; rein. steel	11,307
Westinghouse Airbrake Co., Wilmerding, Pa.; booster parts	416,355

Other Machinery:

Aeme Machine Tool Co., Cincinnati; turret lathes	\$82,480
Alban Tractor Co., Inc., Baltimore, Md.; crane	13,758
American Tool Works Co., Cincinnati; engine lathes	40,496
Austin-Hastings Co. Inc., Cambridge, Mass.; radial drills	58,500
Bertsch & Co., Inc., Cambridge City, Ind.; bending roll	13,198
Brown & Sharpe Mfg. Co., Providence, R. I.; milling machs. ..	34,093
Brown & Sharpe Mfg. Co., Providence, R. I.; screw machs.	28,976
Bullard Co., Bridgeport, Conn.; boring machine	14,387
Bullard Co., Bridgeport, Conn.; turret lathes	33,918
Caterpillar Tractor Co., Peoria, Ill.; tractors	36,955
Caterpillar Tractor Co., Peoria, Ill.; tractor	17,822
Chicago Flexible Shaft Co., Chicago, Ill.; clipping machs.	11,795
Cleveland Tractor Co., Cleveland; tractors	12,670
Continental Tool Works, Div. Excelsio Corp., Detroit; broaches ..	14,925
Crucible Steel Co. of America, New York; tool bits	12,273
Denison Engineering Co., Columbus, Ohio; test stand assys.	127,952
Derbyshire Machine & Tool Co., Philadelphia; punch holder blanks ..	12,255
Fidelity Machine Co., Philadelphia; dies	19,110
Foot-Burt Co., Cleveland; broaching mach.	14,755
Hydro-Blast Corp., Chicago, Ill.; blast clean room	92,604
Industrial Brownhoist Corp., Bay City, Mich.; crane	33,800
Industrial Equipment Co., Oakland, Cal.; locomotive crane	11,150
Ingersoll-Rand Co., Washington; air compressors	96,846
Jones & Lamson Machine Co., Springfield, Vt.; lathes	76,583
Lamson Corp., Syracuse, N. Y.; gun mount parts	18,125
Landis Tool Co., Waynesboro, Pa.; grinding machs.	14,687
Lees-Bradner Co., Cleveland; milling machs.	11,730
Lloyd & Arms, Inc., Philadelphia; lathes	78,474
Lodge & Shipley Machine Tool Co., Cincinnati; engine lathes	27,738

Maddock & Co., Philadelphia; twist drills	10,928
Motch & Merryweather Machinery Co., Cleveland, Ohio; grinders ..	107,833
James M. Motley & Co., Inc., New York; rotary shear	20,995
Philadelphia Drying Machinery Co., Philadelphia; dryer units	17,862
Pratt & Whitney Div. Niles-Bement-Pond Co., West Hartford, Conn.; chambering machines ..	34,518
Pratt & Whitney (Div. Niles-Bement-Pond Co.), West Hartford, Conn.; drill machinery ..	28,975
Rockford Machine Tool Co., Rockford, Ill.; planer	30,521
Seifreat - Elstad Machinery Co., Dayton, Ohio; tinnern machs.	42,397
Singer Sewing Machine Co., New York; sewing machines	17,399
Standard Shannon Supply Co., Philadelphia; twist drills	12,227
Stevens Walden, Inc., Worcester, Mass.; dies	16,197

Stevens Walden, Inc., Worcester, Mass.; die blanks	17,124
Stone Heating & Ventilating Co., Washington; centrifugal fans ..	77,837
Veit & Young, Philadelphia; punches and dies	25,108
York Ice Machinery Corp., York, Pa.; refrig. unit	12,371

Nonferrous Metals and Alloys:

American Metal Co., Ltd., New York; pig tin	\$101,626
American Metal Co., Ltd., New York; pig lead	104,807
American Metal Co., Ltd., New York; antimonial lead	88,950
E. Bers & Co., Philadelphia; antimonial lead	125,200
Federated Metals Division, American Smelting & Refining Co., San Francisco; slab zinc	15,540
Federated Metals Division, American Smelting & Refining Co., San Francisco; pig lead	13,133
Flemm Lead Co., Inc., Long Island City, N. Y.; sheet lead	13,139
International Nickel Co., Inc., New York; alloy-nickel-copper	31,182
International Nickel Co., Inc., New York; nickel-copper alloy	12,550
International Nickel Co., Inc., New York; alloy	13,670
International Silver Co., New York; tableware	162,750
Kennecott Sales Corp., New York; ingot copper	225,439
Landis Machine Co., St. Louis; fuse parts	777,690
National Lead Co., Baltimore, Md.; sheet lead	30,569
Reynolds Metals Co., Richmond, Va.; aluminum alloy	80,262

NEW POR-CE-LOK sheets, utilizing a special lock joint assuring weather tightness without danger of chipped enamel, are shown here being applied on a building by Porcelain Enamel Sheets, Inc., of Cleveland. After corrugations are formed, the sheet is machine-punched along a longitudinal edge for fastening to the structure, cut as designated by the architectural layout, and then enameled.



Steel Plants Improvements in U. S. May Total \$250,000,000 in 1941

• • • Steel plant enlargements and improvements during 1940 are estimated to have totaled about \$150,000,000, an amount which will be greatly exceeded in 1941. Present indications are that total expenditures this year will be in the neighborhood of \$250,000,000, a figure which may be increased if requirements of the national defense program tend to bring about additions and improvements that have not yet been decided upon.

Major improvements carried out during the past year and authorized for 1941 by various companies have been reported to THE IRON AGE as follows:

UNITED STATES STEEL CORP. SUBSIDIARIES, Chicago area, completed: Improving blast furnaces to maintain or increase capacity; installation of new temper mill; concentration of wire facilities; additional heat treating equipment for rods and wire. Under way: Improving blast furnaces for increasing output; construction of new electric furnace plant for increasing stainless and alloy steel production; construction of new equipment for increasing productive capacity for cold reduced tin plate; modernizing existing electric distribution system; additional facilities for rolling small billets; rebuilding coke oven batteries; construction of soaking pits and installation of cranes for economy of operation; sundry replacement of open hearth facilities and auxiliary equipment.

Pittsburgh area, completed: Enlargement of blast furnaces to increase capacity. Under way: Improving blast furnaces and auxiliary equipment for increased output; rebuilding and enlarging open hearth furnaces and auxiliary equipment; installation of cold reduction mill and other equipment to increase production of cold reduced tin plate products; additional power generation and distribution facilities to meet enlarged demand; replacement of wire drawing equipment to provide greater flexibility in meeting market needs; facilities for production of welded steel barges; facilities to increase the output of armor plate, including installation of necessary heat treat-

ing equipment; facilities for fabrication of light armor plate, and for the production of bombs, shells and shell forgings.

Birmingham area, completed: Construction of a central ore conditioning and sintering plant. Under way: Installation of facilities for the increase of productive capacity of pig iron, ingots and rolled steel products, including an additional battery of coke ovens and an additional blast furnace and power plant, installation of new plate mill to roll wider plate, increased sheet mill equipment and cold reduced tin plate facilities, adding to present equipment for ore and coal mines; facilities for the production of shell forgings.

Other areas, completed: In the Cleveland area—installation of new flue-dust sintering plant. In the Pacific Coast area—installation of high-speed automatic sheet mill and auxiliary finishing equipment; warehouse at Seattle for the storage of steel products. Under way: In the Cleveland area—rebuilding blast furnace to increase capacity; installation of additional facilities for the production of cold rolled stainless steel strip and the construction of additional annealing facilities for strip steel. In the Pacific Coast area—warehouse at San Francisco for storage of steel products; installation of new rope and fence products facilities. In the Worcester area—reconstruction and rearrangement of manufacturing facilities for wire and wire products. In the New York area—additional facilities for construction of vessels for Navy and Maritime Commission.

BETHLEHEM STEEL CO.—Early in December a major enlargement program was announced by E. G. Grace, president, to include six new open hearth furnaces, two batteries of coke ovens, additions to an existing by-product coke plant, two new blast furnaces and the rebuilding of two old blast furnaces. The new facilities will give Bethlehem additional capacity of 850,000 net tons of steel ingots, 800,000 tons of coke and 700,000 tons of pig iron. New electric furnace capacity, installation of which was started earlier last year, will

give the company additional capacity in this branch of steel making of 120,000 tons. Estimated cost of the new program is \$18,000,000. Total cost of all expenditures authorized or constructed by Bethlehem in 1940 was about \$50,000,000. Other facilities costing over \$50,000,000 are being constructed at various plants and shipyards and will be paid for and owned by the government.

REPUBLIC STEEL CORP.—Improvements completed or under way in 1940: Youngstown district: A second continuous butt-weld pipe mill for sizes from 1 in. to 4½ in., enlargement of No. 2 blast furnace, skelp coiling equipment on the 19 in. mill, flame control on the bessemer vessels, Lin-de-Surfacers on 19 in. mill, additional soaking pit capacity, skelp pickling equipment for coils.

Warren district: Additional cold mills and auxiliary equipment, additional silicon strip annealing furnaces, improvements to No. 3 hot strip mill, improvements in open hearth pouring aisle to handle larger heats, additional coil welding equipment, new continuous pickling line, additional cutting line for coils, additional buildings for storage and shipping hot strip.

Central district: Increased electric furnace capacity, additional alloy steel finishing equipment, additional galvanneal equipment, carriage type and roller hearth heat treating furnaces, additional soaking pit capacity.

Buffalo district: Improvements to open hearth ladle cranes, increased open hearth capacity, equipment for handling shell steel billets.

Chicago district: Electrification of Moline mill, additional building for wire storage and shipping.

Cleveland district: Enlargement of No. 1 blast furnace to 1000-ton capacity, enlargement of open hearth furnaces, additional soaking pit and enlargement of present pits, improvements to ore docks and storage facilities at the blast furnaces, equipment for producing corrugated sheets, additional building at the 98 in. strip mill for annealing and shipping department's new 54 in. cold mill, new skin pass mill at Monroe plant, additional annealing capacity, improvements to plate processing lines.

Birmingham district: Enlargement of No. 1 blast furnace, in-

stallation of concentration plant at Spaulding mine for beneficiation of ore, opened Spaulding ore mine, installed mechanical coal mining equipment, erected new coal washing equipment.

Gulfsteel district: Enlargement of open hearth furnaces, enlargement of soaking pit capacity, strengthening open hearth building and cranes to handle larger heats, additional wire fence processing machines, additional hot and cold bolt processing equipment, additional road mesh equipment for Truscon Steel.

Port Henry district: Additional mining equipment for increased ore tonnage from mines, improved equipment at sintering plant, improved and additional equipment at the ore concentration plant.

Chateaugay mining district: Additional equipment to increase ore tonnage from mines, additional ore concentration equipment.

Northern coal mines: Mechanization of mining properties, acquisition and equipping Clyde coal mine.

Steel & Tubes division: Installation of additional tube welding equipment, improvements to Elyria plant.

Union Drawn Steel Division: New bar turning machines, additional annealing capacity, additional coil pickling equipment, additional building and heat treating equipment at Gary plant, Beaver Falls plant and Massillon plant, additional stainless finishing equipment at Massillon.

Bolt and Nut division: Additional building for storage and shipping facilities, new hot and cold bolt makers, new straightening equipment.

Berger division: New office building and additional plant buildings, new paint mixing equipment and building.

Niles Steel Products division: Additional manufacturing equipment, modernization of small container line.

Truscon Steel Co.: Additional manufacturing equipment for processing lines, additional automatic welding presses.

JONES & LAUGHLIN STEEL CORP.—At Pittsburgh works—completed during the year: New coal washer, sulphate dryer, coal storage yard and crude pyridine

plant, relined two blast furnaces. Under construction at end of year: Phenol recovery plant, two air-conditioning units, and rehabilitation of stock house bins, new 200-ton stripper crane, four additional annealing furnaces.

At Aliquippa works—completed during the year: New tables for blooming mill; repair stand and crane, additional equipment, tin plate department; additional finishing equipment, seamless tube department; additional continuous wire drawing equipment. Uncompleted at end of year: Air-conditioning unit, blast furnace department; additional warehousing capacity, wire department.

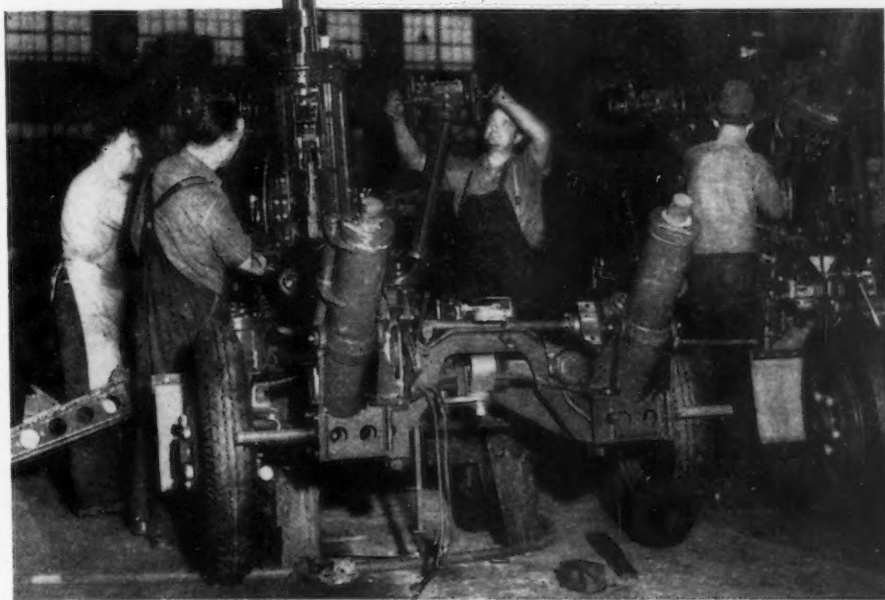
YOUNGSTOWN SHEET & TUBE CO.—Completed in 1940 at Brier Hill works; installation of circular soaking pit; rebuilding of two soaking pits; installation of an ingot turn-around and blooming mill approach table; installation of new Dolomite machine on open hearth charging floor; additional hot top equipment in the mold yard; purchase of 30 new ingot mold cars. Campbell works: pur-

chase of 50 additional open hearth ingot cars; installation of equipment for handling hot blown metal from bessemer converter; blast furnace "C" rebuilt and enlarged with addition of new ore bins and gas cleaner, and new gasoline electric locomotive; installation of new pipe straightening machine for butt-weld threading floor; extension of machine shop No. 1 and extension of new machine tools. At Struthers works: installation of new straightening and cutting off machine for wire department. Indiana Harbor works: automatic control installed on three open hearth furnaces; additional mold handling facilities for bessemer open hearth departments; new vertical edging and coiling equipment added to 20-in. skelp mill; new continuous butt-weld installed; three new resquaring shears added to hot strip finishing department; new four-chambered annealing furnace added to tin department.

Contemplated for 1941: Brier Hill works: additional fireless steam locomotive. Campbell works: addition of ladle transfer pit and two 150-ton mixer type hot metal cars at blast furnaces; equipment to be installed for hot scarfing of billets and slabs; additional roughing stands and flying shear for billet mill. Struthers works: equipment for drawing high carbon copper coated wire; electric patenting and oil tempering furnace and six wire drawing machines for fine wire to be installed; also additional roughing stand and new drive for roughing mill. Indiana Harbor works: Dolomite machine

FINAL ADJUSTMENTS on a 37 mm. anti-aircraft gun carriage are shown being made at the Watertown Arsenal.

Photo by International



for open hearth charging floor; equipment for hot scarfing of billets and slabs and installation of looping floor conveyor at butt-weld tube mill; additional hot saw and tables in billet yard and welder for coiled rods.

NATIONAL STEEL CORP.—Contemplate construction of a new blast furnace and 64 coke ovens at Weirton Steel Co. plant at Weirton, W. Va., and will rebuild two blast furnaces, one at Detroit and one at Buffalo. Weirton hot strip will be converted to make hot rolled strip or structural shapes alternately.

CRUCIBLE STEEL CO. OF AMERICA—For improvements to be carried out during 1941 and 1942, this company has appropriated \$10,000,000. Major improvements will include the installation at the Midland works of a strip mill, electric furnaces, and auxiliary equipment. Consolidation of operations at certain plants is also contemplated.

INTERNATIONAL HARVEST-ER CO.—Addition of two new open hearth furnaces during 1941 has been authorized, which will give the company a total of 11 at its Wisconsin Steel Works. Present annual capacity of 480,000 net tons of ingots will be increased to 580,000 tons. Auxiliary equipment will also be installed, and the total cost of all improvements will be \$1,500,000.

OTIS STEEL CO.—Improvements to cost \$750,000 have been announced by this company and will include increased annealing facilities for sheet and cold rolled strip mills and additional soaking pit capacity at the blooming mill, improvements at the coke works and installation of new turbo blowers and high-pressure boilers at the blast furnaces. The 600-ton No. 2 blast furnace, recently put out for repairs, had a continuous run of 10 years, never having even been banked during that period.

INLAND STEEL CO.—During the past year installed four additional tin pots and built extension to tin mill building to enlarge tin plant capacity; installed six additional circular soaking pits and two waste heat boilers to provide additional heating capacity with a 46-in. blooming and slabbing mill; installed new slab heating furnace,

tables and feeder equipment to provide new heating capacity for the 100-in. plate mill; enlarged main laboratory in Plant No. 2 to provide additional facilities for routine testing and experimental work.

CENTRAL IRON & STEEL CO.—Completed in 1940: 63 by 160 ft. extension to open hearth pit building, including two 25-ton overhead traveling cranes, one equipped with a 65-in. lifting magnet for breaking ladle skulls; sunken pouring pit for teeming high grade steels was also provided in this extension; 45 by 180 ft. lean-to building at open hearth department for use as brick storage, forge shop and electric shop; additional open hearth ladle provided for open hearth department; 20-ton overhead traveling crane and multiple punch installed in flanging department; new crane runway, including 25-ton overhead traveling crane erected over the rolls and mill engine of 126-in. plate mill; steel-yard crane runway 628 ft. long was erected and equipped; two 20-ton cranes and magnets to handle steel for 126 in. sheared and 42 in. universal plate mills. Improvements to be completed in 1941 include: rebuilding of 75-ton basic open hearth furnace for manufacture of low alloy steel, and replacement of two fire tube waste heat boilers in 126 in. plate mill with modern fire tube boilers.

FOLLANSBEE STEEL CORP.—Completed in 1940: one flying tin plate shear line; cold strip buildings; three bell type annealing furnaces; two 28-in., two-high cold mills; one 39 in. and 12½ in. by 34 in. four-high cold reducing mill with auxiliaries. Now under construction: one 39 in. and 12½ in. by 34 in. four-high cold reducing mill; one 49 in. and 18½ in. by 43 in. temper mill; three electric annealing furnaces; three bell type annealing furnaces; one cutting line. Contemplated for 1941: one cleaning line; three bell type annealing furnaces; new machine shop and machine shop equipment.

SHARON STEEL CORP.—Improvements completed in 1940 cost \$500,000. Additional work now under construction totals \$550,000. Contemplated work for 1941 totals \$700,000.

SUPERIOR STEEL CORP.—Completed in 1940: 30-in., four-

high cold rolling mill, cost \$238,000; annealing furnaces costing \$120,000; miscellaneous work costing \$178,000. Miscellaneous work under way or contemplated for 1941, \$75,000.

CONTINENTAL STEEL CORP.—Expended \$650,000 during 1940. No definite arrangements have been made as to plant improvements during 1941.

LACLEDE STEEL CO.—Completed in 1940: increased building capacities for the blooming mill, wire mill, tube mill, and fabricated shop; increased heading capacity for 10-in., four-high continuous strip mill; increased drawing and annealing capacities for wire mill and finishing capacity for tube mill. Now under construction: second billet yard, addition to wire drawing building and handling equipment. Contemplated in 1941: modernization of blooming mill and tables; motor drive for second stand on billet mill; increase heating capacity for 8-in. mill; increase drawing and annealing capacities for wire mill; increased finishing capacity.

HEPPENSTALL CO.—Completed in 1940: \$386,000 worth of miscellaneous work. Contemplated for 1941: various improvements costing \$250,000.

ALLEGHENY LUDLUM STEEL CORP.—Improvements started in 1940 and partly completed at a cost of \$2,000,000. Principal expansion is an increase of electric furnace melting capacity of approximately 50,000 tons of alloy steels annually, and a corresponding increase in finishing facilities. Improvements were carried out at all the company's plants. Additional plans for expansion are under consideration.

GRANITE CITY STEEL CO.—Completed in 1940: two electric annealing furnaces. Now under construction: fifth stand for four-high hot strip mill and coil annealing unit.

HENRY DISSTON & SONS, INC.—Completed in 1940: additional electric annealing furnace; new hot saw at 12 in. bar mill; addition to melting shop for alloy storage; hot top brick manufacturer and washroom facilities; extension to hammer shop building; new 3-ton hammer and four new oil-fired hammer shop furnaces;

cold cut-off saw; magnaflux inspection; micro etch testing; building for storage of refractories spare parts; extension to yard crane runway. Total cost, \$150,000. Under way: extension to melting shop; new 25-ton crane and other changes and improvements which will more than double ingot capacity; two electric annealing furnaces; enlargement of sub-station and new central boiler house, 600 lb. design, 175,000 lb. per hour capacity, pulverized coal. Total cost, \$600,000.

FIRTH-STERLING STEEL CO.—Expended \$26,000 in 1940 and will spend \$60,000 during 1941.

CARPENTER STEEL CO.—Improvements completed in 1940 cost approximately \$1,000,000. Other work now under construction to cost \$85,000, while appropriations for 1941 improvements total \$165,000.

WORTH STEEL CO.—Will install 100-ton open hearth furnace in 1941.

ALAN WOOD STEEL CO.—Expenditures in 1940 totaled \$425,000. Improvements contemplated for 1941 at a cost of \$1,000,000 include new blast furnace equipment, \$250,000; electric drive for blooming mill, \$600,000, and miscellaneous improvements, \$150,000.

ROTARY ELECTRIC STEEL CO.—Improvements completed in 1940 total \$150,000, work under way totals \$30,000, and improvements contemplated for 1941 total \$150,000.

NORTHWESTERN STEEL & WIRE CO.—Will install in 1941 one 50-ton electric furnace at an approximate cost of \$125,000.

LATROBE ELECTRIC STEEL CO.—Work completed in 1940 cost \$200,000 and an expenditure of the same amount will be made this year.

RUSTLESS IRON AND STEEL CORP.—Improvements completed last year cost \$1,400,000. Work now under construction will cost \$929,000. Improvements to be started this year will total \$725,000.

PITTSBURGH STEEL CO.—Completed in 1940: one bank of soaking pits and a cleaning house for wire department at Monessen, Pa. In conjunction with Pittsburgh Coke & Iron Co. will build

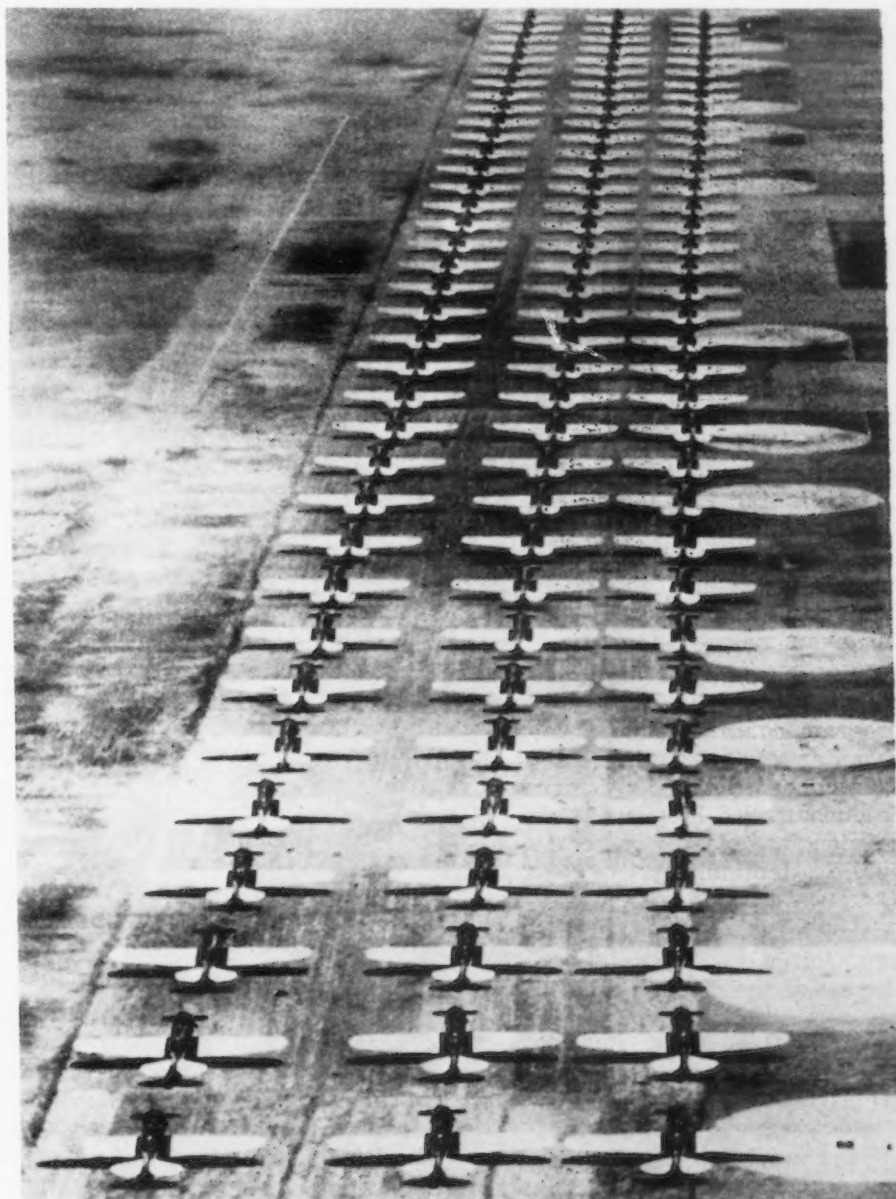
battery of by-product coke ovens at Monessen with 432,000 tons annual capacity.

HARRISBURG STEEL CORP.—Expended about \$800,000 last year to provide for production of aerial bombs for the War and Navy Departments.

JESSOP STEEL CO., Washington, Pa.—Completed new building for electroplating and arc welding and installed large drum type grinding and polishing machine for finishing stainless and stainless-clad sheets and plates.

WHEELING STEEL CORP.—Completed in 1940: installation of a new Fretz-Moon tube mill and

improvements to skelp mill in Benwood plant; construction of new warehouse and shipping building at Martins Ferry; alterations to 45-in. slab mill and 60-in. hot strip mill at Steubenville works to increase speed and provide rolling of wider sizes; improvements to new process mill to enable it to finish materials of wider sizes produced on the hot strip mill; installation of new benzol refining equipment to replace obsolete equipment; installation of four lines of galvanizing equipment. At the Yorkville works equipment was installed to convert a single pass skin mill to a twin mill. No major improvements contemplated for 1941.



12,000 MILITARY PILOTS will "get their wings" in these training planes photographed at Randolph Field, Texas. The trainers are 45-hp., low-winged monoplanes, patterned after modern fighters.

Cleveland Finds Some Machinery Not Yet Utilized for Defense

Cleveland

••• After months of close association with the national defense program, Cleveland industrialists say that irritations and inconsistencies remain numerous, but nevertheless the program appears to be coming slowly into better focus week by week. Belatedly and after incalculably costly delays, definite objectives are appearing, with better coordination and authority.

Emphasis through the first half of 1941 at least is expected to be centered upon supplying the equipment demands of machine tool makers, the Navy, certain caliber machine guns, and aircraft engine manufacturers. This trend may mean that companies holding contracts for other armament items may be unable to proceed as fast as they plan now.

One of the most serious problems in the current picture deals with labor. Like the rest of the general public the sense of national emergency is not imbued deeply enough in machine operators to yield the extra production which is known to exist. Some plants in the Cleveland area are having difficulty establishing third shifts because men balk at being transferred due to prejudice against night work or fear of losing overtime pay.

Like other recent developments which helped define the defense program, concentration on imperative items is welcomed, although it is conceded that criticism may be encountered late in 1941 when deficiencies elsewhere come to public attention.

All through 1940 industries in this vicinity went ahead on their own initiative in order to be abreast of the demand which they saw coming. Expansions in Cleveland alone provided 3,000,000 sq. ft. of space at a cost of around \$34,000,000. Payrolls at the end of the year were around \$4,900,000 per week, with 147,500 wage earners at work in 2000 plants, compared with 125,700 a year earlier and 161,250 in 1929.

Local companies went ahead

with extensive additions even though they had only received very modest orders directly from the government. In some cases capacity was expanded with the knowledge that normal peacetime domestic demand would be greatly exceeded. Other companies have loaned experts or equipment to the government and occasionally even supplied parts free of charge when badly needed for testing purposes by government departments lacking funds.

However, one finds at present much existing capacity is not being utilized even though the government was long ago informed of its availability. A number of companies in Ohio have advertised openly for work recently. One Lima firm in an advertisement Jan. 2 listed 24 machine tools for which work is desired immediately, stating that "these are modern tools in a new building," and that "defense work is preferred."

At the same time production of certain aircraft engine parts justifiably requires new equipment, according to J. O. Eaton, chairman of Eaton Mfg. Co., parts making firm, who says that in the company's Cleveland plant several items for aircraft engines are now being turned out in volume with available shop equipment, but "notwithstanding the fact there are over 1000 machine tools in the plant, an entirely new set of specialized machine tools are required before we can get into production on one of the parts which has been allotted to us."

Mr. Eaton went on to say that the layman must realize the defense program cannot be consummated overnight and that "the aircraft, automotive and machine tool industries are losing no time."

In the production of airplane engines, not much existing automotive machine tool equipment can be adapted cheaper than new machinery can be purchased, authorities at Cleveland say. Tolerances good enough for automobile engines are not low enough for aircraft. Out of 800 parts offered one large auto producer, it was

found that existing automotive equipment was capable of doing a good job on only a handful. Certain equipment could be adapted, but the tearing down and rebuilding process would be long and expensive. During the past week Studebaker's plans for three plant expansions to produce aircraft engines, and Buick's plans to expand in Michigan, were announced, adding to the list of automotive companies entering the field.

The widely heralded Reuther plan put forward by the C.I.O. for making use of automotive plant facilities in the aircraft program is believed at Cleveland to contain several points worth considering, namely the use of tool rooms and presses provided it is recognized that this necessarily would result in choke points in the manufacture of automobiles.

Highlights of the current situation in several key industries here may be summarized as follows:

Machine Tools — A definite schedule of the defense program's future requirements is still needed. Demand has been very unevenly distributed and the whole load unwieldy. The industry worked a miracle by doubling its output in a short time without protection of any kind, and will spread out much farther in 1941. Meanwhile, it has taken much criticism without attempting to cite many legitimate alibis. It is estimated three-quarters of the machine tool industry is operating double or triple shifts and the entire industry is paying liberal overtime.

Aircraft Industry — Constant redesigning causing much delay. Bottlenecks on certain types of forgings and certain motor parts. Confusion and friction caused as production widens into outside fields. Nevertheless, production cycles on many parts have been cut in two during the past year.

Steel Industry — A constant source of confusion has been the rapid changes in government plans and specifications. Uncertainty over desired lengths of shell steel, fragmentation characteristics and other matters have caused delays. Many irritating instances where

almost impossibly quick shipments desired or where specifications are impossible to meet.

Unexplainable difficulties have occasionally disrupted production in a few metal-working plants in Northern Ohio. One contractor who undertook to machine several

hundred airplane parts received a few and then forgings stopped coming for a period of several weeks. In several cases inability to obtain proper fixtures caused delays. In another instance a dispute over ownership of the scrap resulted in a long wrangle.

district records, he is also urged to watch industrial publications and newspapers for defense awards and then apply directly to recipients of these contracts. Here, too, a complete list of available equipment and type of work handled should be submitted.

Those interested in obtaining prime contracts from arsenals must keep in touch with the arsenal itself, providing the usual information. However, a survey in the Ordnance file is essential, for arsenals frequently consult with the department district offices concerning the ability of a company to handle a contract. Col. Armstrong pointed out that each district's engineering staff is comprised of "commodity" specialists, thoroughly versed in government requirements, purchasing procedure and in the production of armament products. A bidder is welcome to use the staff in determining his costs. Many instances were cited of where the department showed a bidder how to cut his own cost estimate and thus get the order and still make a legitimate profit. One firm obtained an \$8,000,000 order in this way. The engineering staff frequently helps a successful bidder set up a production line to handle the contract.

"It is our purpose," Colonel Armstrong says, "to carry out the defense program and aid American industry as well. We welcome any company, large or small, that can contribute to defense."

Chicago Ordnance Officer Sees Small Defense Plants "Welcome"

Chicago

••• Col. Donald Armstrong, executive officer of the Chicago Ordnance District, which has distributed more defense contracts—\$272 millions—than any other of the 13 Ordnance Districts — this week told *The Iron Age* that the Army welcomes subcontractors and seeks to bring facilities of small companies into defense production.

He said that defense contracts will go to thousands of subcontractors, that much more production is required, that weekend plant shutdowns deprive the defense program of millions of needed man-hours, and commented that U. S. industry is giving "loyal and patriotic cooperation."

Already, Col. Armstrong said, an extensive file of productive industrial equipment has been established in each Ordnance district (1300 plants in Illinois, northern Indiana, Wisconsin, Minnesota, North and South Dakota alone.) For example—a machine-tool guide book, always available to prime contractors, lists all machine tools according to classifications adopted by the Navy and the National Machine Tool Builders Association. If, say, turret lathes are needed, this section of the book reveals all the plants in the district in possession of workable turret lathes. The size, capacity, range and other important data are listed for each machine in each plant. When either the Ordnance department or the holder of a prime contract seeks equipment to handle a certain type of work, "the guide book" instantly shows where the machines are available, how many machines of each type

are there and the other data needed.

Another complete and separate file contains all the companies surveyed, their manpower, executive personnel, financial rating, the type of work handled and even the tolerances to which the plant is accustomed to work. When a firm, large or small, is included on this list it is in line for its share of defense orders.

How to get on the list? Much has been said about the "red tape" a prospective subcontractor must undergo to get a share of the defense appropriation. The procedure is simple. Merely contact the nearest district office of the

(See list of Ordnance offices on Page 75J)

Ordnance Department either in person or by letter and request an investigation of the plant. A questionnaire will be mailed and, after it has been returned properly answered, the department will decide whether a survey is necessary. If one is made by a member of the engineering staff, the complete report is written up and placed in the permanent records. And anyone with work to farm out can tell from that record whether a certain plant is equipped to do a specific job.

The engineering staff of 10 officers and eight civilians (in the Chicago office) seeks out all likely sources. But they cannot cover nearly all. The best method is to apply directly to the district office for an investigation. The department serves only as a clearing house for subcontracts. So, although the subcontractor has gained an important foothold when he is listed in the department's

Hamel Organizes New Scrap Metal Firm

••• Paul H. Hamel, formerly general manager of the By-Product Materials Division of Reliance Steel Corp. here, has purchased the physical assets of the division from Reliance and has organized the By-Products Iron & Steel Corp. of which he is vice-president and treasurer, to deal in iron and steel scrap and metals. This new corporation will continue doing business at the same location, with yard and office at 10309 Harvard Avenue, Cleveland, under the active management of Mr. Hamel. Louis A. Brown, who is associated with Mr. Hamel, is the secretary of the newly organized By-Products Iron & Steel Corporation.

Ford Describes New Magnesium Foundry

Detroit

••• Detailed information about the new magnesium foundry being installed by Ford Motor Co. at its River Rouge plant has been made available by the company. The foundry, one of the largest in the world, probably is also the first important "captive" producer of magnesium castings.

Ford has previously used some magnesium castings, notably in the agricultural tractor produced in the past two years, but has been supplied by outside sources. Major use for output of the new foundry, however, will be for Ford production of Pratt & Whitney aircraft engines for the U. S. Army. Significantly, the foundry has been designed with a capacity somewhat greater than the company's needs for its own use in making airplane engines.

The new foundry, which will cost \$800,000, is being incorporated into the present Rouge foundry building. The construction schedule calls for it to be ready for operation early in March, at which time the \$21,000,000 airplane engine plant also is to be ready. Plans call for casting a total of 110,000 pounds of magnesium castings a month after operations are underway. The alloy to be cast consists of six to nine per cent aluminum, one and one-half to three per cent zinc, and the remainder magnesium which will be supplied by Dow Chemical Co., Midland, Mich.

The installation will occupy 100,000 sq. ft. on two floors at the southwest corner of the Ford foundry building. On the first floor will be sand core-making facilities, a final inspection department, the shipping department, laboratory and office.

Nineteen gas-fired melting furnaces on the second floor with a combined capacity of 500,000 lb. per month will melt and refine the alloy. Four of the furnaces will each have a capacity of 2000 lb., four will be 400 lb. capacity and seven will be 200 lb. capacity. Four 100 lb. furnaces will serve as refiners.

Baked cores will be carried on

four continuous type conveyors to pouring stations near the furnaces for the casting operation. After casting, trimming and primary cleaning operations will be performed, before heat treating. Two vertical type annealing furnaces equipped with conveyors will be used for heat treat, which will require about 40 hours, part of the time in an SO_2 gas atmosphere.

Final testing equipment will include that for chemical and physical tests of materials and product, and water testing equipment for some of the castings. New storage bins for sand and facilities for magnesium metal storage also will be provided. Machining will be performed in the airplane engine plant.

The new foundry will employ approximately 350 men.

Alabama Plants to be Listed for U. S. Defense

Birmingham

••• Every industrial plant in Alabama that can be utilized in the nation's defense program will be listed and its possibilities examined by the Associated Industries of Alabama. Wallace L. Caldwell, association president, characterized the survey as a response to the challenge to industry by William S. Knudsen, production director for national defense.

Aluminum Industries' New Plant of Welded Design

••• Contracts for the design and construction of Aluminum Industries, Inc.'s 130,000-sq. ft. foundry and paint shop which is to be erected on a new 27-acre site on Werk Road, Cincinnati, have been awarded to the Austin Co., engineers and builders.

The plant will be of all-welded structural steel. Four 50-ft. monitor bays with five intermediate 30-ft. bays will be provided in the structure which will be completely equipped with modern handling facilities. The structure and building equipment will represent an investment of approximately \$400,000.

100 Companies Listed In Iron Ore Industry

Washington

••• Production of merchantable iron ore in 1939 amounted to 51,641,055 gross tons of which 31,908,989 tons came from open pits and 19,732,066 tons from underground, according to the Bureau of the Census. The value of this ore at the mine was \$150,667,042. The average per cent of iron content of ore (natural) was 51.01.

Production in Minnesota totaled 32,163,859 tons of which 28,525,906 came from open pits and 3,637,953 came from underground mines. The value of the Minnesota production at the mine was \$96,241,025. Average per cent of iron content of ore in Minnesota mines was 52.17.

Production in the Michigan-Wisconsin area totaled 10,151,025 tons of which 1,246,592 came from open pits and 8,904,433 tons from underground. Value at the mine of this ore was \$32,409,653. Average iron content of ore was 51.73.

Mines in the Alabama area produced 5,953,408 tons of ore, 526,566 from open pits and 5,426,842 from underground. Value at the mine was \$10,016,697. Average iron content of ore was 37.08.

Production from iron ore mines in all other states amounted to 3,372,763 tons, 1,609,925 from open pits and 1,762,838 tons from underground. This ore was valued at \$11,999,667. Average iron content of the ore was 62.32 per cent.

There were 100 operating companies in the iron ore industry. Of these, 31 were located in the Minnesota field, 24 in the Michigan-Wisconsin area, 22 in Alabama, and 29 in all other states. Of the total number of operating companies, three operated mines in two of the designated areas and one company operated mines in each of the four areas. Five companies were engaged in the production of both iron ore (ore containing less than five per cent manganese, but which is valued chiefly for its iron content).

The total number of iron ore mines operated in the United States in 1939 was 174, of which 68 were in Minnesota, 41 in the Michigan-Wisconsin area, 31 in

Alabama, and 34 in the other states: California, one mine; Georgia, four; Missouri, six; New Jersey, four; New Mexico, one; New York, four; Pennsylvania, four; Tennessee, two; Texas, one; Utah, one; Virginia, two; Washington, three; and Wyoming, one. The average number of wage earners employed during the year in the 174 mines in the United States was 20,126.

Northern Ohio Scrap Men Elect Officers

Cleveland

New officers of the Northern Ohio chapter of the Institute of Scrap Iron & Steel Inc. are as follows

President, Alex Miller, Columbia Iron & Metal Co., Cleveland; first vice-president, Sam H. Urdang, the A. Shaw Co., Cleveland; second vice-president, Sam Nathanson, the M. Cohen & Son Co., Cleveland; secretary, Jack Levand, the Simon-Levand Co., Cleveland; treasurer, Louis G. Hehman, the Philip W. Frieder Co., Cleveland.

The executive committee members are: Chairman, Max Friedman, the Max Friedman Co., Cleveland; Leonard Abrams, the Atlas Steel & Supply Co., Cleveland; Leon F. Bialosky, Cleveland Iron & Metal Co., Cleveland; Manly R. Burgin, Summer & Co., Cleveland; Paul H. Hamel, By-Products Iron & Steel Corp., Cleveland; J. A. Mirman, the Akron Scrap Iron Co., Akron, Ohio.

Chicago Gets \$1,100,000 In Defense Contracts Daily

••• An average of more than \$1,100,000 a day in defense contracts was received by greater Chicago manufacturers during December. Of the total of \$34,620,000 awarded, 48 companies received their first taste of defense work. All told, 170 separate contracts were let, of which 16 were for \$500,000 or more, the largest amounting to \$6,311,085, going to Diamond T Motor Car Co. for army trucks.

New Ships to Need 600,000 Tons of Steel

Washington

••• The Maritime Commission, after receiving the go-ahead signal from the White House, was working this week on a plan calling for \$350,000,000 worth of new merchant ship construction which the Administration will superimpose on the existing shipbuilding program.

The new construction calls for 200 merchant ships of 7500 tons each to be of one standardized design. Total steel requirements are estimated at 600,000 tons, including 400,000 tons of plates, the remainder to be shapes, bars, shafting, and such additional items as boiler tubes and winches.

Although shipbuilding companies had been advised of the rough details of the plan for several days, it was not made public until last Friday at President Roosevelt's regular bi-weekly press conference. The Chief Executive explained the program was made necessary because of the large amount of tonnage being sunk, a situation which he said pointed to an ultimate world shortage of bottoms. Asked if the new construction would help the British government, Mr. Roosevelt replied that he did not have the faintest idea.

In getting the program under way as soon as possible, Mr. Roosevelt allocated \$36,000,000 out of a special White House contract authorization fund for the construction of new shipbuilding ways. The President referred his questioners to the Maritime Commission for further details.

The \$350,000,000 will go for actual construction work on the ships, which will be government owned. Mr. Roosevelt said that the question of whether the new ways would be government owned had not been definitely determined.

He estimated that by following a standardized design it would be possible to reduce the usual construction time by six to eight months so that ships can be turned out inside a year. Present plans being developed contemplate prefabrication at plants as much as possible so that the shipyards will largely undertake an assembly job.

The Chief Executive commented that existing steel facilities will be

adequate to handle the job and that while he anticipates no shortage of labor, the reservoir of skilled labor from training courses now under way will have to be drawn upon.

Data on Defense Facilities Requested

Chicago

••• The Illinois Manufacturers' Association has forwarded a questionnaire to 3000 member firms for the purpose of obtaining information regarding manufacturing facilities adaptable to defense production. The survey in Illinois is part of a national survey which is being sponsored by the National Industrial Council, which organization embraces state and local industrial organizations throughout the country. The questionnaire requests information on plant identification, nature of business, plant data, transportation and power, personnel and inventory of productive equipment.

Willys-Overland Defense Orders Top \$12 Millions

Toledo

••• More than \$12,000,000 of defense orders, now on the books of Willys-Overland Motors, Inc., include \$8,862,040 of shells for U. S. artillery; \$1,912,000 of machine gun parts for the navy; \$1,424,115 of small reconnaissance cars, and \$75,000 of forgings for British trucks. In the final quarter of 1940 the company will have moved 10,000 cars or about a third of the total business on the last year's model.

R.A.F. Gets 8 Planes Daily From Buffalo

G. W. Vaughan, president of Curtiss-Wright Corp., reports that mass production at his organization's Curtiss Aeroplane Division at Buffalo, N. Y., has reached a point enabling the delivery of eight fighter planes daily to Great Britain's R. A. F. All of these planes, he said, are of the fast, highly maneuverable Curtiss Hawk 81A pursuit type which Great Britain's R. A. F. in turn has named the "Curtiss Tomahawk."

Canada's Steel Output Up 48% Above '39

Toronto

••• Production of steel ingots in Canada for November set a new high record for that month, with output 22 per cent ahead of November, 1939, and brought production for the 11 months of this year 48.3 per cent above the 1,187,177 tons produced in the corresponding period of 1939 and 71.1 per cent over the 1,029,461 tons in the same period of 1938.

Current capacity for steel ingots is approximately 2,400,000 tons per year. At the end of 1939 Canada's effective steel production capacity was 2,056,622 tons and at the end of 1938, 1,990,000 tons. Despite the substantial increase in Canadian production, imports have been averaging about \$6,000,000 per month equivalent to more than half the total Canadian output. Heavy imports have been due in part to deliveries of a large portion of the Dominion Steel & Coal Corp.'s output to England. With new war plants coming into production in the months ahead, steel requirements will continue to increase.

Following the expenditure of \$3,516,000 on improvements to the Trenton, N. S., plant of the Nova Scotia Steel & Coal Co., subsidiary of Dominion Steel & Coal Corp., this plant will be fully engaged in large scale production of shells and other war materials by next spring. Financing of the undertaking will be done by the federal government. The Trenton plant is a fabricating works. On completion of expansion and installation of new equipment the plant will continue as a producer of steel products. The steel to be used, as in the past, will be provided by the Dominion Steel Corp., from its Sydney, N. S., plant. Dominion Steel & Coal Corp., has stepped up its production facilities at Sydney by more than 30 per cent in the past year.

Ross H. McMaster, president of the Steel Co. of Canada, Ltd., Hamilton, Ont. told shareholders that sales for the year have very greatly exceeded in tonnage and dollar value those of any previous year in the company's history. Maintenance of unchanged prices,

in spite of important additions to cost, has been a helpful influence in retarding inflationary tendencies and has gained broad approval.

When the new plate mill comes into operation next March, he stated, plant additions authorized since the commencement of the war will have reached a total of \$8,000,000, making expenditure

\$23 Million Contract For duPont Plant

••• The War Department has announced the award of a contract for approximately \$23,000,000 to E. I. duPont de Nemours & Co. for increased facilities for the manufacture of smokeless powder at the Indiana Ordnance Works, Charlestown, Ind. This added contract brings the total cost of this plant to approximately \$74,000,000.

over the past five years an aggregate of \$15,000,000.

W. F. Angus, president of Dominion Bridge Co., Ltd., Montreal, said that with the volume of business far in excess of any recent year, in face of considerably heavier taxation requirements, net earnings are expected to show wide expansion as compared with the previous year. The big increase in earnings reflects a much higher operating rate since the outbreak of war. He stated that Eastern plants have been fully occupied or close to it most of this year. At the present time the company has so much business on its books that it finds itself in the position of being unable to proceed with much needed plant expansion at Lachine, Que.

Milfound Foundry To Erect New Building

Waupun, Wis.

••• The Milfound Foundry Co. shortly will erect a new building on property furnished by the city officials. The move is made necessary by increased production at the Shaler Co. National Rivet department which has large national defense program orders.

Contracts Awarded For Louisville Ordnance Plant

Pittsburgh

••• The general contract for manufacturing buildings, heating plant, and service building for the new \$5,000,000 Navy ordnance plant near Louisville, Ky., to be built and operated by Westinghouse Electric & Mfg. Co. under a leasing arrangement, has been awarded to the J. G. White Engineering Corp., New York.

Grading and foundation work at the 135-acre site will start within a few weeks, structural work is expected to get under way in the spring, and buildings are scheduled for completion by July.

According to F. D. Newberry, manager, emergency products division of Westinghouse, a large part of the work will be done on subcontracts.

The new plant will employ approximately 1000 skilled workers and will operate principally as an assembly unit, receiving parts from other ordnance plants and manufacturers. Upon completion, guns and mounts will be proof-fired nearby and later shipped to naval vessels for installation.

Many of the parts received at the Louisville plant will be manufactured at a \$16,000,000 ordnance plant which Westinghouse will construct and operate for the Navy at Canton, Ohio. This latter plant will use considerably more machine tools than the Louisville plant and employ approximately 2000 skilled workers, since it is designed principally for machining of naval ordnance equipment.

Westinghouse has assigned 30 of its principal factory supervisors to the task of preparing for the construction and equipping of the Louisville and Canton plants. This management staff is located at Pittsburgh and is selecting machine tools and other equipment and developing manufacturing operation layouts and information of all kinds.

About \$6,250,000 of machine tool orders and equipment for the two plants have been let and during the next few months another five or six million dollars of machine tool orders will be awarded.

Worcester Firm Makes Revolvers for Bobbies

••• Harrington & Richardson Arms Co., Worcester, Mass., on Jan. 2 was awarded a contract for \$300,000 of revolvers by the British purchasing commission. The revolvers are for London bobbies. Stockholders of the Worcester company have sanctioned a reduction in its authorized capitalization by 2236 first preferred shares, the entire number outstanding. Following this change the company will have outstanding 150,000 shares of \$1 par Class A, and an equal number of no par common shares.

Budd Wage Increases Range From 3c. to 8c.

Detroit

••• Budd Wheel Co. and the Budd Mfg. Co., currently engaged on important shell making contracts for the government in addition to regular work which is largely automotive, have reached an agreement with the UAW-CIO calling for a contract that will grant approximately \$400,000 in increased wages and vacation bonuses for the 6000 employees of the companies. The new contract will call for a general increase of from 3 to 8c. an hour and a 2 per cent bonus to be paid in May to all employees on their total earnings for 1940, according to the union. The contract sets the mini-

mum hourly wage rate at 75c. for women and 78c. for men.

Other terms of the contract provide for the payment of time and one-half for Saturdays, regardless of the number of days worked in the week and double time for Sunday and holiday work.

Milwaukee Payrolls Reach 11-Year Peak

Milwaukee

••• Weekly wages here in the last four months have risen so rapidly that payrolls are at the peak of the last 11 years. November employment records disclose 93,200 wage earners, 11,500 more than in July with the weekly wage in November \$31.05 as against \$28.45 in July, average of \$27.75 in 1939, \$25.76 in 1938 and \$27.68 in 1937.

Mississippi Fosters Defense Plant Growth

Jackson, Miss.

••• Organization has been announced here of the Associated Industries of Mississippi, designed to foster and cooperate in the development of business and industry in the national defense program and at the same time give support to the established industries of the state. L. O. Crosby, Picayune, Miss., industrialist, is president of the new organization.

Bryant Sees 35% Gain In Factory Building

Cleveland

••• With industrial facilities available or under way wholly inadequate to meet the needs of the national defense program even after months of record-breaking awards and construction activity, 1941 is sure to see steadily increasing factory building volume, said George A. Bryant, president and general manager, the Austin Co., Cleveland. The extent of the increase is inescapably linked with the trend of international affairs, in which an early decisive victory for the Allies offers the only hope of curtailing the expanding rate of defense expenditures during the coming year.

"A realistic view of the present situation leads conservative observers to anticipate a minimum increase in industrial construction of 35 per cent for the coming year," Mr. Bryant said.

Allegheny-Ludlum to Expand at Buffalo

••• The Buffalo plant of The Allegheny Ludlum Steel Corp. plans expansion by 30 to 40 per cent to meet national defense needs, Donald M. Scott, general manager, said. The plant will make stainless steel castings for anti-aircraft guns, military searchlights, also airplanes and equipment for explosives.

WHERE COMPANIES SEEKING DEFENSE ORDERS CAN REGISTER

Here is a list of the U. S. Ordnance offices:

Birmingham, Ala., 800 Comer Bldg., Lt. Col. W. F. Vander Hyden.

Boston, Room 1501, 140 Federal St., Lt. Col. James S. Crawford.

Chicago, 309 W. Jackson Blvd., Col. Donald Armstrong.

Cincinnati, 831 Enquirer Bldg., Lt. Col. Fred A. McMahon.

Cleveland, 1450 Terminal

Tower Bldg., Maj. H. W. Reedall.

Detroit, 1832 National Bank Bldg., Lt. Col. Richard Z. Crane.

Los Angeles, 409 Chamber of Commerce Bldg., Maj. A. R. Baird.

New York, Room 1815, 80 Broadway, Col. John K. Clement.

Philadelphia, Mitten Bldg., Maj. D. N. Hauseman.

Pittsburgh, New Federal

Bldg., Lt. Col. James L. Guion. Rochester, N. Y., 1122 Mercantile Bldg., Lt. Col. Roy L. Bowlin.

St. Louis, U. S. Custom & Courthouse Bldg., Maj. Randall J. Hogan.

San Francisco, U. S. Federal Office Bldg., Col. K. B. Harmon.

Springfield, Mass., 95 State St., Col. Robert Sears.

Wilmington, Del., 1466 Nemours Bldg., Maj. John P. Harri-

November Steel Exports off 15.7%

••• For the third successive month exports of iron and steel (except scrap) from the U. S. declined in November, preliminary figures released by the Metals and Minerals Division of the Bureau of Foreign and Domestic Commerce reveal. During November 713,827 gross tons of these materials valued at \$42,863,811 moved in this trade registering declines of 15.7 per cent in quantity and of 9.3 per cent in value as compared with the October trade of 846,584 tons valued at \$47,244,586. A year earlier, in November 1939, exports amounted to 332,899 tons valued at \$22,791,622, a considerable increase over the months immediately preceding.

Exports for the 11 months ending Nov. 30 totaled 7,050,362 tons valued at \$432,091,928, or, roughly, three times as great in quantity and value as the trade of the comparable period of 1939—2,104,967 tons valued at \$150,896,242.

The United Kingdom, although

U. S. IMPORTS—NOVEMBER, 1940 (In Gross Tons)

Pig Iron	
Canada	98
Iron Ore	
Spain	5,500
Canada	28,486
Mexico	219
Newfoundland and Labrador	10,670
Cuba	11,400
Brazil	7,650
Chile	165,200
	229,125

Manganese ore—(35 per cent and over)

Battery grade	
Union of South Africa	48
Gold Coast	1,209
Other	
Russia	1,152
Cuba	10,508
Brazil	7,840
British India	13,750
Netherland Indies	227
Philippine Islands	180
Union of South Africa	6,386
Gold Coast	18,024
	60,997

buying less iron and steel than in October, continued to be the chief export market with its November purchases of 400,953 tons comprising 56 per cent of the month's total trade. Canada ranked second with purchases totaling 83,946 tons, and was followed by the Union of South Africa, 34,297 tons, Netherlands Indies, 19,657 tons, and Brazil, 19,240 tons.

As in immediately preceding months non-alloy ingots, blooms, billets, etc., continued to be the chief material exported—the 226,437-ton total including 206,202 tons sent to the United Kingdom, 11,347 tons taken by Canada, and 3811 tons which moved to Japan. Second place in point of tonnage went to alloy ingots, blooms, billets, etc., with a total of 58,404 tons of which the United Kingdom took 52,083 tons and Canada 6312 tons.

Other outstanding commodities from the standpoint of the tonnages exported in November were non-alloy "other" plates, 54,440 tons, including 25,329 tons taken by the United Kingdom and 10,956 tons sent to Canada; non-alloy black steel sheets, 42,706 tons, including 12,945 tons exported to Canada, 7697 tons to the United Kingdom, and 7471 tons to the Netherlands Indies; and non-alloy "other" steel bars, 37,950 tons, of which 12,672 tons went to the United Kingdom, 4864 tons to the Union of South Africa, and 2945 tons to Canada.

Westinghouse Merges Gearing, Motor Division

Pittsburgh

••• Effective December 16, 1940, the Westinghouse Gearing Division became a subordinate unit of the Motor Division, under the supervision of R. W. Owens, according to a recent announcement by A. C. Streamer, general manager of the Westinghouse East Pittsburgh divisions. L. R. Botsai, formerly sales manager of the company's small motor division at Lima, Ohio, has been appointed manager of the gearing department, succeeding R. S. Marthens, who is being transferred to other activities in the Emergency Products Division.

Vascoloy-Ramet Extends Sales Engineer Force

••• For several months, Vascoloy-Ramet Corp., Fansteel Metallurgical Corp. and Vanadium-Alloys Steel Co. have worked intensively to improve the quality of Vascoloy-Ramet tools, to improve production and distribution facilities, to expedite deliveries, and to give more assistance and service to tool users. Processes of refining basic rare metal ores into carbide powders of uniform purity and physical structure have been developed and expanded so that work formerly requiring days has been shortened into hours. Further manufacture of carbide powders into blanks and finished tools and dies has been improved and speeded by the installation of additional modern equipment, air conditioning, and the adoption of a number of new and exclusive methods. Most plant departments are now operating 24 hours a day.

Heretofore, Vascoloy - Ramet tools and blanks have been sold and serviced through the various district offices of Vanadium-Alloys Steel Co. and authorized agents. This service is being extended by organization of a direct sales engineering force under management of Vascoloy-Ramet Corp. Factory owned branches have been established in Detroit, Cleveland, Cincinnati, Pittsburgh, Providence, Hartford, Jersey City, Philadelphia and Milwaukee. Among the carbide tool engineers being transferred to the Vascoloy-Ramet sales organization are: Wilfrid Pulver and Clarence J. Busch, who will be located at Milwaukee; C. W. Blade, at Hartford, Conn.; F. B. Sturm, at Detroit; Sam A. Miniea and John Lee, at North Chicago. Herbert B. Clark and James A. Fraser will continue as sales manager and assistant sales manager.

Stran-Steel Awarded Navy Housing Contract

Detroit

••• Stran-Steel Division, Great Lakes Steel Corp., was awarded the contract for steel framing for 600 dwellings for navy workers at San Diego, Cal., through William Simpson Construction Co. The tonnage was estimated at approximately two tons per dwelling or a total of 1200 tons.

Steel Employment Higher in November

••• Approximately 9000 employees were added to the payrolls of the steel industry during November, bringing the employment in the industry to a total of 577,000, it is indicated in a report by the American Iron and Steel Institute. During October, steel employment averaged 568,000, while 561,000 were employed in November, 1939.

Reflecting the short month and the November holidays, total steel payrolls of \$87,921,000 during the month were slightly below October payrolls of \$90,768,000. In November a year ago, steel payrolls totaled \$86,682,000.

Wage-earning employees in the steel industry earned an average of 86.2c. an hour in November, compared with 85.6c. in October and 84.7c. in November, 1939.

Milwaukee Foundry Companies Merged

Milwaukee

••• Grede Foundries, Inc., has been formed by a merger of the Liberty Foundry, Inc., Wauwatosa, Wis.; Spring City Foundry Co., Waukesha, Wis., and the Milwaukee Steel Foundry Co., Milwaukee, with a capitalization of \$1,000,000. The transaction involves no new stock but will be made with an interchange of stock of the old companies for the new.

William J. Grede, president of Spring City and chairman of the board of Milwaukee Steel Foundry, will be president of the new firm which was organized to simplify the corporate structure and to coordinate the management.

1941 Catalog On Plastics

••• The 1941 Modern Plastics catalog, a treatise on the plastic industry in the United States, has just been issued by the Breskin Publishing Corp. Containing over 476 pages, the catalog is illustrated and organized to make the finding of specific information an easy task. It includes a table on solvents and plasticizers and a properties chart.

A. W. S. Publishes Lectures On Welding Metallurgy

••• A series of lectures on welding metallurgy sponsored by the New York section of the American Welding Society is now available in book form. The lectures are being given this winter at the Brooklyn Polytechnic Institute by Prof. O. H. Henry and G. E. Claussen of that institution. The lectures are reproduced in attractive booklet form, profusely illustrated and containing 357 pages of text. Volume I consists of the first series of 10 lectures given at the Brooklyn Polytechnic Institute last year, and volume II includes the series of lectures to be given this year by Prof. Otto H. Henry and Dr. G. E. Claussen of that school. The two volumes are bound under one cover and may be obtained from society headquarters, 33 West 39th Street, New York, for \$1.50.

Volume 1 consists of: Temperature changes during welding, types of steels and their manufacture, crystals, the weld melt, the iron-iron carbide equilibrium diagram, rate of cooling, alloy steels, and metallurgical constants. Volume 2 consists of: Heat and time in welding, the weld during cooling, brittleness and cracking, shrinkage, fluxes and slags, alloy steels, stainless steels, preheating and stress relief.

Standardization of Tool Steels is Under Way

••• Standardization and classification of tool steels used in production of tools, fixtures and gages, etc., is being undertaken by a committee of representatives of leading engineering societies as well as governmental bureaus, under the sponsorship of the American Society of Tool Engineers.

Designated as Project B-52 by the American Standards Association, the standardization work will attempt to do for such steels what already has been done on general steel types. A committee being appointed to organize the work includes E. W. Ernest, General Electric Co.; C. E. Ives, Ives Engineering Laboratories, Chicago; and Carl J. Oxford, National Twist Drill Co. as representatives of the American Society of Tool Engineers.

C-I To Reopen Pencoyd Openhearth Plant Feb. 1

Pittsburgh

••• Carnegie-Illinois Steel Corp. as a national defense emergency measure is to reopen Feb. 1 the steel works for the production of ingots at the company's abandoned Pencoyd plant in Philadelphia. The plant has been idle since April, 1938. Although the steel-making equipment there is considered obsolete, the decision to start making ingots will mean a potential capacity of approximately 240,000 tons of open hearth steel a year.

Operations, it is understood, will cease when the present national defense emergency is ended. At present no processing of any kind will be done at the plant except the making of ingots. This material will probably either be fabricated at other corporation plants or will be sold for export to Great Britain. About 150 men will be employed.

Square D Co. Moves Controller Division

Milwaukee

••• The Square D Co., has transferred its Milwaukee offices and all production of the industrial controller division to a new 125,000 sq. ft. plant here, where production capacity has been increased 50 per cent. One of the features of the new plant is a power distribution system which utilizes the company's own products to provide a flexible system. The manufacturing area is laid out for straight-line production in two 60-ft. monitor bays and three 40-ft. low bays.

Republic Strikers Get Vacation Pay

Cleveland

••• Vacation pay to participants in the 1937 strike has been distributed by Republic Steel Corp., conforming to a decision by the U. S. Circuit Court of Appeals at Philadelphia. Computation of back pay due strikers for idle time other than vacations has been held up by the National Labor Relations Board, according to Philip Murray, CIO president and chairman of the Steel Workers Committee.

New Defense Plants Planned for Ohio

Cleveland

• • • Announcement of a large new plant for a leading maker of aircraft valves and other airplane parts is expected momentarily here. Plans call for completion of new facilities late in 1941 with several thousand additional employees required. Heavy purchases of machine tools and other equipment have been made.

Ohio Crankshaft Co., another firm prominent in the national defense program, has just issued details of the large new plant which is under construction here. Employment for nearly 1000 men by the end of this year will be provided by this \$5,000,000 government financed factory, which is located on a 7-acre site. Production is expected to get under way in June. The building will cost approximately \$1,000,000 and will have nearly 200,000 sq. ft. of floor space. About \$4,000,000 will be spent for specialized plant equipment which was ordered several months ago.

Present plans call for production of about 1000 airplane engine crankshafts per month, although facilities will be available for an output of 1250 units monthly.

Goodyear Engineering Corp., a newly formed subsidiary of Goodyear Tire & Rubber Co., Akron, Ohio, will manage and operate for the U. S. Army Ordnance Department a new powder-bagging plant at Charlestown, Ind., on a cost-plus-fixed fee basis. Around \$2,500,000 will be spent for equipment and management services.

H. K. Ferguson Co., Cleveland, will share in the construction of a \$14,000,000 ammunition loading plant at Milan, Tenn.

The Carbone Construction Co., Cleveland, was low bidder on the first unit of the new airplane engine research laboratory to be constructed at Cleveland municipal airport here.

The New \$13,000,000 TNT plant which will manufacture explosives for the Ravenna, Ohio, shell loading plant will be located on Sandusky Bay, just west of Huron, Ohio. The Trojan Powder Co. of Allentown, Pa., will construct and operate the plant.

Scrap Exports Slump Under Licensing Plan

Washington

• • • Exports of scrap from the United States in November, the first complete month when all shipments were subject to license, totaled only 74,349 gross tons valued at \$1,303,814, according to figures released by the Metals and Minerals Division, Bureau of Foreign and Domestic Commerce. Exports of these materials in October had amounted to 258,926 tons valued at \$4,650,299, while the trade in November, 1939, aggregated 272,656 tons valued at \$5,173,374. Of the November total 35,709 tons went to Canada, 33,971 tons to the United Kingdom, and 2,685 tons to Honduras.

Roosevelt Urges Tax Boost for Defense

Washington

• • • A recommendation that "a greater portion of the defense program be paid for from taxation than we are paying today" was made by President Roosevelt on Wednesday when he sent his budget message to Congress. In his annual "State of the Union" message delivered to Congress in person on Monday, Mr. Roosevelt also made reference to the necessity of higher taxes and issued a warning against getting rich from the defense program.

There was little in his "state-of-the-Union" message which the President had not said before. He forecast a "physical attack" upon this country if the dictator nations win the war, pledged further support to countries abroad who are resisting aggression, outlined in detail the ideals of the democracies and set forth the four essential human freedoms.

On the status of the defense program, the President said frankly that he was not satisfied with the progress. He reported finished aircraft are being turned out behind schedule, that on the warship program shipbuilders are ahead of schedule. He did not go beyond insisting in general terms that "the immediate need is a swift and driving increase in our armament production."

F.T.C. Files Against Wire Rope Makers

Washington

• • • Alleging unlawful agreement, combination and conspiracy to eliminate competition, the Federal Trade Commission has issued a complaint against the Wire Rope and Strand Manufacturers, Inc., Washington, three of its officers and 16 member companies, which, according to the commission, manufacture about 95 per cent of the country's production of wire rope. The complaint in the course of its charges attacks the basing point system.

The commission said the association was organized to meet requirements of the National Industrial Recovery Act, continued to function after the act was declared unconstitutional and that it is still operating. Its policies and activities, it is alleged are directed by its officers consisting of Harry J. Leschen, president; George S. Whyte, Kenosha, Wis., chairman of the board and George P. Lamb, Washington, executive secretary.

It is charged that the association members have fixed and maintained uniform delivered prices, terms and conditions for the sale of wire rope in the United States by use of a price-fixing formula adopted under the NRA code. It is claimed that the so-called system of delivered prices prevent the differences in the cost of freight delivery between the respective places of business and those of intended purchasers from creating any advantage or disadvantage to such purchasers in delivery costs.

According to the complaint, the respondents divided the United States into basing point areas so that purchasers in each area get the same delivered price regardless of their distance from the manufacturer; "required distributors to resell according to the formula; adopted a uniform basic and chain discount system; defined what constitutes a recognized distributor and forbade distributors from selling 'any wire rope other than that made by the particular respondent member with whom the distributor had a distributing contract.'"

Half U. S. Factory Facilities Found Idle

Washington

• • • Estimating that 50 per cent of the nation's manufacturing facilities are now idle and could be brought into the production of goods for the defense program, Morris L. Cooke, attached to the staff of Labor Defense Commissioner Sidney L. Hillman, has announced that the Defense Commission is working on a system of farming out work whereby the smaller shops can be brought into defense production.

Mr. Cooke's statement was made in connection with the announcement of a detailed plan to utilize idle tool and man-power in three Virginia counties which was laid before the Commission by the Shenandoah Valley Defense Council. Discussion of the plans of revitalizing "ghost" town areas and bringing shutdown facilities in the counties of Shenandoah, Augusta and Rockingham took place at a meeting of representatives of the counties held with War, Navy and Commission officials. D. W. Thomas, president of the Chesapeake & Western Railway, acted as spokesman for the group who had pooled their idle facilities on a cooperative basis.

Mr. Thomas pointed out that these three Virginia counties, even though predominantly rural, have found 365 machine tools available. The survey showed that these machine tools are idle 90 per cent of the time and could be used on sub-contracting work for the Army and the Navy. He said that a survey by the employment service showed that there was plenty of experienced, skilled labor ready to operate these machines. These men are not willing to leave the area to obtain defense work in the big cities because, Mr. Thomas explained, when not employed these men went back to the farm until local plants needed them again.

"We are not out to solicit orders to make money, but we are here to aid national defense," Mr. Thomas said. "We propose to use our local committee as a contracting agent. The committee will obtain orders and divide them up among the plants in our areas on a cooperating basis."

Donner-Hanna Plans 55 New Coke Ovens

Buffalo

• • • Construction of 55 new coke ovens and an additional plant expansion and modernization program is being considered here by the Donner-Hanna Coke Corp. The company has filed an application with the War Department for permission to amortize the cost of this projected improvement over a 5-yr. period. An estimated \$2,000,000 is involved.

The coke ovens, together with 74 now under construction at Bethlehem Steel Co.'s Lackawanna, N. Y., plant should aid greatly in preventing any coke bottleneck in this area. Donner-Hanna now has 201 coke ovens out of the 552 in this district.

McKee Company Seeks Designers, Checkers, Computers

Cleveland

• • • Holding numerous new contracts and ready to occupy new office quarters, Arthur G. McKee & Co., Cleveland engineers and contractors at 2422 Euclid Avenue, are seeking additional men, principally designers, checkers, squad leaders and computers, according to Stephen A. Derry, who has been appointed employment director.

Mr. Derry, director of the Derry Plan for Co-operative Placement, 872 Hanna Building, Cleveland, has opened a temporary office in the McKee building for interviewing applicants qualified for the positions.

The dollar volume of contracts taken by the company during 1940 will be approximately twice that of the largest previous year in its history, stockholders are told in a recent letter from Robert E. Baker, secretary. The company's new offices at 2300 Chester Avenue, Cleveland, will be completed and occupied in January. Although floor space in the new building is over 50 per cent greater than in the present quarters on Euclid Avenue, the large volume of work now on hand and under negotiation will necessitate retention of the company's present office space as well as the new building. Draftsmen working upon the plans for the steel plant in Brazil will be housed in the older structure.

Industrial Machinery Exports at New Peak

Washington

• • • United States' exports of industrial machinery in November established a new record for the second successive month with total shipments amounting to \$45,251,696, compared with \$43,567,434 in October, according to the Machinery Division, Department of Commerce. All the large machinery export classes showed moderate gains except textile, sewing, and shoe machinery, which declined rather sharply.

Machine tool exports to England amounted to \$19,218,029, or slightly below the October value of \$19,902,633. November shipments to that country accounted for 77 per cent of total machine tool exports. Exports to other large purchasers of American machine tools were as follows: Consignments to Japan dropped to \$478,008 from \$1,393,434 in October; shipments to the Soviet Union jumped to \$1,025,208 after having declined to \$130,599 in the previous month; exports to Canada amounting to \$2,614,978 were maintained on about the same level as in October when they totaled \$2,678,330. All of Latin America took shipments valued at \$199,041 compared with \$147,161 in the preceding month.

Valued at \$27,413,932, November exports of power-driven metalworking machinery reached a new high, 2 per cent above shipments in October. Shipments of milling machines rose to \$6,053,585 from \$4,917,159 in the previous month and exports of drilling machines were up to \$1,656,819 from \$1,329,796, but declines were recorded for lathes, down to \$5,891,102 from \$6,947,124, and for grinders, which dropped to \$3,943,114 from \$4,639,305. In fact, total exports of machine tools were slightly below the previous month, but increases in other items combined to maintain the total for all power-driven metalworking machinery. Thus rolling mill equipment rose to \$1,653,819 from \$368,777 and forging machinery was up to \$757,854 from \$422,102. Shipments of metalworking machinery other than power-driven amounted to \$911,038 as against \$811,255 in October.

National to Build New Stack, Ovens

Pittsburgh

• • • National Steel Corp. will definitely go ahead on construction of a new blast furnace and additional coke ovens at its Weirton Steel Co. plant which will add approximately 300,000 tons to the annual pig iron capacity there. National Steel's board of directors approved this plan which was tentatively announced several weeks ago by E. T. Weir, board chairman.

In addition to the Weirton program a blast furnace at the Great Lakes Steel Plant, Detroit, and one at the Hanna Furnace Co., Buffalo, both companies being subsidiaries of National Steel Corp., will be rebuilt and enlarged.

Total cost of the improvements at the three plants approximates \$15,000,000 and increases annual pig iron capacity of National Steel Corp. by approximately 700,000 tons.

The Weirton Steel program, in addition to the new blast furnace, will include 45 coke ovens, extension of the ore yard, extension or construction of a number of plant buildings, and installation of cranes, power lines, and other types of equipment. New facilities are expected to be ready for operation late in 1941.

According to preliminary estimates the completion of the construction at Weirton Steel will increase that company's pig iron and coke capacity by more than 40 per cent and without additions to primary steel producing facilities will enable the production of approximately 240,000 tons of ingots per year in excess of present capacity.

Census Figures on Barrel, Keg, Drum Manufacturers

Washington

• • • Bureau of the Census figures compiled on the basis of data supplied by manufacturers of steel barrels, kegs, and drums show that the value of products increased from \$48,175,322 in 1937

to \$49,165,973 in 1939; that the number of wage earners decreased from 6231 to 6072; and their wages increased from \$7,356,641 to \$7,360,075. The number of establishments rose from 58 in 1937 to 64 last year.

High Court Upholds Written Contract

• • • The Supreme Court this week upheld the National Labor Relations Board in its ruling that an employer is required to sign a written contract when he has reached an oral agreement with an employee.

In deciding for the NLRB in the H. J. Heinz Co. case, the high court, in an unanimous decision, said:

"It is true that the National Labor Relations Act, while requiring the employer to bargain collectively, does not compel him to enter into an agreement. But it does not follow, as petitioner argues, that having reached an agreement, he can refuse to sign it because he has never agreed to sign one. He may have never agreed to bargain, but the statute requires him to do so. To that extent his freedom is restricted in order to secure the legislative objective of collective bargaining as the means of curtailing labor disputes affecting interstate commerce.

"The freedom of the employer to make an agreement relates to its terms in matters of substance and not, once it is reached, to its expression in a signed contract, the absence of which, as experience has shown, tends to frustrate the end sought by the requirement for collective bargaining.

The Heinz decision was hailed by Philip Murray, CIO-SWOC president, as vindication of the SWOC in the "Little Steel" strike of 1937. William Green, AFL president, said he regarded it "as a sound and constructive decision." Murray said the ruling was a rebuke to the irresponsibility of those companies which have paid lip service to collective bargaining but have provoked industrial stoppages by refusing to carry through the bargaining process to its logical and legal conclusion.

Weaver, Gazert Head New Ordnance Plants

Pittsburgh

• • • In connection with its national defense production, the Westinghouse Electric & Mfg. Co. which will operate two government ordnance plants, one to be built at Louisville, Ky., and the other at Canton, Ohio, announces the following appointments:

James R. Weaver has been appointed manager of the Louisville plant. Mr. Weaver was, up until his appointment, director of equipment, inspection, and test for Westinghouse. He has been with the company since 1915 when he started in as a tool designer. At present he is president of the American Society of Tool Engineers, on two committees of the American Society of Mechanical Engineers, and is chairman of executive and sectional committees for standardizing surface quality of the American Standards Association.

R. V. Gazert has been named manager of the Canton, Ohio, plant. Mr. Gazert came to Westinghouse in 1914 as a machinist apprentice. His career has been in the line of supervisory work, first at East Pittsburgh, then at Chicopee Falls and most recently at Sharon. There he served from 1936 up to his present appointment, as superintendent and manager of manufacturing.

Both men, by reason of their appointment, are now part of the emergency products division of Westinghouse. This is the division formed at the beginning of the national defense emergency which handles all special defense contracts.

Buffalo Arms Co. to Operate Ordnance Plant

Buffalo

• • • Organization of the Buffalo Arms Corp. as a subsidiary of Houdaille-Hershey Corp. and the official announcement of erection of an ordnance plant covering seven acres of ground in suburban Cheektowaga, was made here. The 700 tons of steel required now is being fabricated by R. S. McMannus Steel Construction Co. in Buffalo.

Steel Output In 1940 Of 65,246,953 Tons Sets Record

Production during December of 6,300,768 net tons of open hearth and bessemer steel ingots brought output for 1940 to the record-breaking total of 65,246,953 tons, according to the monthly report of the American Iron and Steel Institute.

The total for 1940 was 7 per cent higher than the previous peak in 1929 of 60,829,752 tons of open hearth and bessemer ingots, and exceeded by 26 per cent the 1939 figure of 51,584,986 tons.

In producing its new record output last year, the steel industry operated at an average of 82.22 per cent of its capacity as of Dec. 31, 1939. In 1929, operations averaged 89.05 per cent of capacity,

while during 1939 the industry operated at an average of 64.70 per cent of capacity. During the final quarter of last year the industry operated at an average of 95.49 per cent of capacity.

Ingot production in December was slightly ahead of the November total of 6,282,824 tons, and was 8 per cent greater than in December, 1939, when 5,822,014 tons was produced. The rate of operations in December was 93.92 per cent of capacity, compared with 96.49 per cent in November and 86.13 per cent in December, 1939.

During last month ingot production averaged 1,425,513 tons per week, as against 1,464,528 tons a week in November and 1,317,198 tons a week in December, 1939.

1940	Reported Production (Net Tons)		Calculated Production All Companies		Number of Weeks	Per Cent of Capacity
	Open-Hearth	Bessemer	Monthly	Weekly		
January	5,262,760	285,714	5,655,315	1,276,595	4.43	84.11
February	4,113,446	205,527	4,409,035	1,064,984	4.14	70.16
March	3,990,510	191,559	4,264,755	962,699	4.43	63.42
1st Quarter	13,369,285	682,800	14,329,105	1,102,239	13.00	72.62
April	3,721,264	176,335	3,974,706	926,505	4.29	62.04
May	4,489,665	258,709	4,841,403	1,092,867	4.43	72.00
June	5,122,390	304,381	5,532,910	1,289,723	4.29	84.97
2nd Quarter	13,333,319	739,425	14,349,019	1,102,922	13.01	72.66
1st 6 Months	26,702,604	1,422,225	28,678,124	1,102,581	26.01	72.64
July	5,165,672	322,302	5,595,070	1,265,853	4.42	83.40
August	5,548,397	369,674	6,033,037	1,361,859	4.43	89.72
September	5,417,784	365,188	5,895,232	1,377,391	4.28	90.75
3rd Quarter	16,131,853	1,057,224	17,523,339	1,334,603	13.13	87.93
9 Months	42,834,457	2,479,449	46,201,463	1,180,416	39.14	77.77
October	5,930,952	408,053	6,461,898	1,458,668	4.43	96.10
November	5,745,287	418,491	6,282,824	1,464,528	4.29	96.49
December	5,781,915	399,048	6,300,768	1,425,513	4.42	93.92
4th Quarter	17,458,154	1,225,592	19,045,490	1,449,428	13.14	95.49
Year	60,292,611	3,705,041	65,246,953	1,248,029	52.28	82.22

November Steel Imports Decline to 728 Tons

• • • Totalling only 728 gross tons valued at \$165,009, November imports of iron and steel (other than scrap) reached a new low in the modern record of this trade, preliminary figures prepared by the Metals and Minerals Division of the Bureau of Foreign and Domestic Commerce reveal. This trade was one-fifth as large in point of tonnage as that of October when 3724 tons valued at \$196,854 entered the country and, on this same basis, amounted to only 5 per cent of the receipts of November, 1939—14,379 tons valued at \$1,005,774.

Scrap imports were slightly increased at 252 tons valued at

\$3,519—these totals comparing with 242 tons valued at \$3,351 imported in October. Honduras was the chief source of scrap in November with a total of 149 tons, followed by Mexico, which supplied 99 tons, and by Canada with 4 tons.

General Electric Elects Charles E. Wilson President

• • • Charles Erwin Wilson, acting president of General Motors Corp., has been elected president of the company. William S. Knudsen, former president, resigned in June, 1939, to become production chief of the National Defense Advisory Commission.

Defense Board Warns Scrap Price Must Drop

Washington

• • • Taking on the nature of an ultimatum, the Price Stabilization Division of the National Defense Advisory Commission has served notice on the scrap trade that unless it voluntarily reduces the price of No. 1 heavy melting steel to "not to exceed \$20 per ton at Pittsburgh" drastic steps looking toward control will be recommended.

The vigorous action was announced Tuesday by Defense Commissioner Leon Henderson, head of the Price Stabilization Division.

Henderson did not indicate what procedure he had in mind in suggesting that drastic steps would be recommended in the absence of a voluntary reduction of scrap prices, held to be vital to prevent a rise in steel prices. There were reports he might recommend application of the "draft industry" law enacted by Congress last summer. These reports were not verified.

The Defense Commissioner said that representatives of the trade agreed with government authorities that current prices of scrap are several dollars per ton higher than is necessary to bring out tonnage required to support present capacity operations of the steel industry.

The statement made public on Tuesday added:

"The ultimate objective of the price reduction requested is to bring the market to a level not to exceed \$20 per ton for No. 1 heavy melting steel scrap at Pittsburgh.

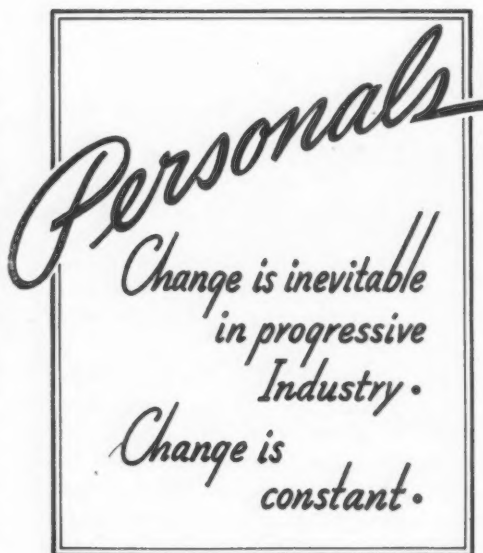
"Those present at yesterday's conference agreed that, although requirements for scrap are at a record level, the supply will be adequate to meet all needs, provided available material is released for consumption. Scrap trade authorities also agreed that a reduction in prices will thaw out frozen supplies.

"Yesterday's meeting with representatives of the scrap trade was the second since October, and followed a conference two weeks ago with steel mill purchasing officials for whom scrap is the outstanding raw material purchased on the open market.

• **R. M. Marshall**, vice-president and secretary, Woodward Iron Co., Birmingham, has been elected executive vice-president of the Pittsburgh Coke & Iron Co., Pittsburgh, succeeding the late Albert P. Meyer. Mr. Marshall previously was general manager of the Dunbar Corp., Dunbar, Pa., and at present is also vice-president of the Kerchner Marshall & Co., Pittsburgh and Cleveland. Prior to his connection with Woodward Iron, he was vice-president and general manager of Sloss-Sheffield Steel & Iron Co. for two years.

• **J. E. Lautsbaugh**, formerly director of purchases at the Mansfield, Ohio, plant of Westinghouse Electric & Mfg. Co., for 22 years, has been made director of purchases of all products of the Crosley Corp., Cincinnati.

• **Harry L. Erlicher**, purchasing agent of General Electric Co., Schenectady, N. Y., since 1931 and an employee of the company for 40 years, has been elected a vice-president. He will continue to be in charge of the company's purchasing activities. He joined General Electric as a messenger boy at the age of 14. Shortly thereafter he was transferred to the purchasing department and was made a buyer in 1910. He was promoted to assistant purchasing agent in 1923 and eight years later was named general purchasing agent.



• **M. J. Devaney** has been promoted to the assistant general superintendent's post at South works, Carnegie - Illinois Steel Corp., succeeding **H. A. Strain**, who has been promoted to the position of director of raw materials, fuel and power, of Carnegie-Illinois Steel Corp. At Gary works **E. G. Hill** has been promoted to the assistant general superintendent's post, succeeding **S. M. Jenks**, who recently was advanced to the general superintendency.

Mr. Devaney has been continuously associated with South works for the last 40 years. He started April 28, 1900, as a signal boy on the plant docks and advanced through various positions

to his most recent post of division superintendent of steel production.

Mr. Hill joined the corporation in 1938, when he was placed in charge of research at Gary works. Since then he has served as assistant to the general superintendent in charge of technological coordination. Prior to his corporation association Mr. Hill had been professor of metallurgy at the University of Pittsburgh from 1920 to 1930, and subsequently in industrial research work for the Mellon Institute, and also director of research of the Lukens Steel Co.

At South works Mr. Devaney is succeeded as superintendent of steel production by **Michael F. Yarotsky**, who has been assistant superintendent of the division, Mr. Yarotsky, in turn, is succeeded by **George E. Gustafson**, who has been associated with South works for the last 33 years and recently has been serving as superintendent of No. 2 open hearth. Mr. Gustafson is being replaced in the open hearth position by **Howard A. Parker**, who has been serving as assistant superintendent. Mr. Parker is succeeded as assistant by **George W. Bruce**.

The vacancy created by Mr. Hill's promotion at Gary works is being filled by **Arthur D. Beers**, chief metallurgist of the plant for the last three years, who now is promoted to the position of assistant to general superintendent.



HARRY L. ERLICHER, vice-president of General Electric Co.



M. J. DEVANEY, assistant general superintendent of South works, Carnegie-Illinois Steel Corp.



E. G. HILL, assistant general superintendent, Gary works.



JAMES E. DAVENPORT, vice-president of engineering, development and research of American Locomotive Co.

• **James E. Davenport** has been appointed vice-president of engineering development and research of the American Locomotive Co., succeeding **Joseph B. Ennis**, who has been made senior vice-president.

Mr. Davenport entered railroad service after his graduation from the Georgia School of Technology in 1909 as a special apprentice at the West Albany shops of the New

York Central and continued in various capacities with this road up to 1940 when he was made assistant vice-president of engineering of American Locomotive Co.

Mr. Ennis started his career in the railroad industry in 1895 as a tracer in the drafting room of the Rogers Locomotive Works and joined the American Locomotive Co. in 1901. The following year he was transferred to New York and put in charge of designs and calculation-specifications for locomotives. He progressed through the engineering department and was made vice-president in charge of engineering in 1917.

• **Robert G. Glass** has been promoted to the position of assistant manager of operations, Chicago district, by Carnegie-Illinois Steel Corp. Mr. Glass, who for the last four years has been assistant to the manager, is a graduate of Ohio State University. He first secured employment as a transitman for the Baltimore & Ohio Railroad in 1906. Two years later he was made assistant engineer of the railroad at Baltimore, and in 1911 was appointed division engineer at New Castle, Pa. He has been connected with the steel company in Chicago since 1912, when he started as assistant inspection engineer. He was assistant manager of the department of metallurgy and inspection from 1923 until his appointment as assistant to manager of operations in 1936.



JOSEPH B. ENNIS, senior vice-president of American Locomotive Co.

• **W. L. Beaudway** has been appointed executive vice-president of Chicago Malleable Castings Co., Chicago, and **J. T. Llewellyn, II**, has been made vice-president.

• **George A. Bryant**, since 1930 executive vice-president and general manager of the Austin Co., Cleveland, has been elected president and general manager, succeeding the late W. J. Austin. Mr. Bryant received his engineering



MICHAEL F. YAROTSKY, superintendent of steel production, South works.



ARTHUR D. BEERS, assistant to general superintendent, Gary works.



GEORGE A. BRYANT, president and general manager of the Austin Co.

education at the University of Illinois and first became associated with the Austin Co. as a field engineer 27 years ago. In 1916 he was named New England district superintendent for the company. Two years later he was made general sales manager, continuing in that capacity until early last year.

• **James E. Mac Murray**, founder of Acme Steel Co., Chicago, with which he has been associated for more than 50 years, has resigned as chairman of the board, although he will continue as a member of the board of directors. The new chairman is **Ralph H. Norton**, president for the last 18 years. Mr. Norton began his association with the company in a production and engineering capacity in 1904. **Charles S. Traer**, who succeeds Mr. Norton as president, was formerly vice-president in charge of production and joined the Acme organization in 1915. **Frederick C. Gifford**, first vice-president and director of sales, has retired from active duty but will continue as a member of the board of directors. Mr. Gifford has had charge of the distribution of Acme products since 1918. **Chester M. Mac Chesney** becomes first vice-president and secretary. **Carl J. Sharp**, vice-president, succeeds Mr. Gifford as director of sales, and **Thornton A. Rand** is now treasurer and assistant secretary.

• **John C. Hopkins** has become associated with the William M. Bailey Co., Pittsburgh, and will represent this company in a sales capacity from Cleveland, especially covering the Middle West and the Southern district. Mr. Hopkins has had a wide and successful experience as a blast furnace operator as well as in various executive positions in the steel industry.

• **H. L. Charlton**, vice-president of Reynolds Metals Co., will be in charge of erection and purchases at the aluminum plant now under construction at Sheffield, Ala. **Basil Horsfield** will be manager of the new plant; **R. S. Sherwin**, consulting engineer responsible for all chemical processing, and **B. L. Baxter**, chief electrical engineer. **W. W. Binford** is to be operating superintendent of the aluminum plant; **J. C. Black**, operating superintendent of the aluminum reduction plant; **Paul E. Winnia**, resident purchasing agent; **W. C. Diggs**, mechanical engineer in



HARRY A. STRAIN, director of raw materials, fuel and power of Carnegie-Illinois Steel Corp.

charge of maintenance; **C. E. Baumgarten**, chemical engineer; **J. E. Nordquist**, electrical engineer; **R. S. Sherwin, Jr.**, chemical engineer; **W. C. Hawkins**, assistant purchasing agent; **I. J. Martin**, mechanical engineer; and **E. J. Appel**, aluminum production engineer.

• **Harry A. Strain**, for the last four years assistant general superintendent of the South Chicago works of Carnegie-Illinois Steel Corp., has been promoted to the position of director of raw materials, fuel and power. Mr. Strain began his association with United States Steel Corp. subsidiaries in 1905 as a clerk employed in the auditing department of American Steel & Wire Co. at Joliet. His actual iron and steel making experience began one year later at the blast furnaces at Joliet. He has been employed at the South Chicago works continuously for the last 20 years, with the exception of one year spent as superintendent of blast furnaces for the Woodward Iron Co. He received his formal technical education at Armour Institute of Technology.

• **Chester D. Tripp** has been elected president of the Grip Nut Co., Chicago, succeeding **John D. Sharp**, who has resigned. **Ernest H. Weigman**, a member of the sales organization during the past 10 years, has been appointed sales manager.

• **C. B. Jahnke**, who joined the Cooper-Bessemer Corp., Mt. Vernon, Ohio, in 1935 as chief engineer, has been elected president and a member of the executive committee. He continues as general manager, having been appointed to that position in 1938.

• **Leonard S. Parker**, who for a number of years has been superintendent of production for Skilsaw, Inc., Chicago, has been named vice-president in charge of operations. He has been associated with the Skilsaw organization since 1931.

• **H. C. Strom** has been elected vice-president of the Pittsburgh Steamship Co., subsidiary of United States Steel Corp., and **D. C. Potts** has been appointed manager of traffic, succeeding Mr. Strom, it is announced by **A. H. Ferbert**, president of the company.

• **M. K. Peck**, who has represented William Sellers & Co., Inc., in the Cleveland territory, has been recalled to the Sellers home office at Philadelphia to aid in production problems involved in orders in connection with the National Defense program. Mr. Peck received his training in the Sellers offices before taking over the Cleveland territory, to which he will return at the end of this emergency work.

• **Charles N. Fitts**, vice-president of the former New England Structural Co., Everett, Mass., has become associated with the Bethlehem Steel Co. He will make his headquarters at the Boston office.

• **Paul M. Konecnik**, chemist at Ditzler Color Co., Detroit, for the past six years, has become connected with Murray Corp. of America in the time study department.

• **D. A. Wallace**, president, Chrysler division, Chrysler Corp., and "father" of the Superfinishing process, has been appointed by the American Society of Tool Engineers to represent that organization on the committee dealing with the classification and designation of surface qualities of the American Standards Association.

• **Milton G. Englert** has been appointed sales representative of Jones & Laughlin Steel Corp. at Milwaukee, under the direction of the Chicago district sales office. Mr. Englert started with Jones & Laughlin in 1936 and since 1939

has been in the Boston sales office in a sales capacity.

• **Jacob J. Phifer**, former superintendent of Fairchild wire works, Tennessee Coal, Iron & Railroad Co., Birmingham, has been appointed assistant general superintendent of Fairchild steel works, of the same company, and **Marion G. Crosthwait**, former assistant superintendent of the wire works, has been named to succeed Mr. Phifer. The latter, who has been with the United States Steel Corp. since Feb. 1, 1920, became identified with the Tennessee company Jan. 1, 1937, as assistant superintendent of Fairchild wire works. He became superintendent of that operation July 1, 1938. Mr. Crosthwait entered the service of the United States Steel Corp. March 16, 1920, as a draftsman at the Fairchild works of the American Steel & Wire Co. He became head draftsman in 1923, continuing in that position after the Fairchild operation was taken over by the Tennessee company in 1933. He was promoted to assistant superintendent Sept. 1, 1939.

• **Joseph L. Trecker**, vice-president, and **Frances Trecker**, assistant chief engineer of the Kearney & Trecker Corp., Milwaukee, left for Washington last week to service as "dollar a year" men for the war department. Their company was one of the first to initiate the practice of farming out contracts for the manufacture of machine tools and they are expected to become special advisers in the efficient distribution of arms contracts to small firms.

• **Charles W. Cristal** has been appointed sales manager of the electrical construction department of the Dingle-Clark Co., contracting engineer for the steel industry and other heavier industries, with headquarters in Cleveland. Mr. Cristal is a graduate of the U. S. Naval Academy and of Massachusetts Institute of Technology and brings to his new connection 17 years of varied experience in the electrical industry.

• **Charles O. Butler**, Warren Pipe Co. of Massachusetts, Inc., was elected president of the New England Foundrymen's Association at its forty-fifth annual meeting at Hotel Gardner, Boston, on Jan. 8. **Raymond Meader**, Whiting Machine Co., Whitinsville, Mass., was elected vice-president, while

Arthur Gibby, East Boston, was reelected treasurer, and **Ernest F. Stockwell**, Barbour-Stockwell Co., Cambridge, Mass., secretary.

• **Gerald B. Duff** has been made sales engineer in the Newark, N. J., and New York territory for the Despatch Oven Co., Minneapolis. He will make his headquarters at 68 Clinton Avenue, Newark.

• **Edward B. Newill**, from 1930 to 1937 chief engineer of Frigidaire Division of General Motors and since that time assistant general manager, has been made assistant to **E. R. Breech**, vice-president of General Motors Corp. He will be succeeded by **Edward R. Godfrey**, who has been head of the Frigidaire manufacturing division since 1930. Mr. Godfrey's former position will be taken by **Mason M. Roberts**, who relinquishes his post as superintendent of the Moraine City plant, to be known as manager of plants and will have supervision of all manufacturing operations. His assistant will be **Russell V. Polen**, formerly assistant to Mr. Godfrey.

In another executive transfer, **George R. Auld**, who has been superintendent of the company's Taylor Street plant, has been made general superintendent of a new plant Frigidaire is building to house operations in connection with the government's defense program. Other changes include the promotion of **Scott L. Davis**, formerly assistant to Mr. Auld, to the position of general superintendent of the Taylor Street plant. **J. W. Krueger**, previously a supervisor of manufacturing processes at the Moraine City plant, succeeds Mr. Roberts as general superintendent of this Frigidaire plant.

• **William H. Hundt**, manager of the New York office of Luria Brothers & Co., scrap brokers and dealers, has been elected a director of the Franklin Society for Home Building & Savings, New York. Mr. Hundt has been connected with Luria Brothers for 30 years except for an absence in the U. S. Army during the World War.

• **Stanley M. Hopkins** has been appointed Pacific Coast manager of Wheeling Steel Corp. with headquarters in San Francisco. Mr. Hopkins formerly was district sales manager at the company's Buffalo office and prior to that was employed at Wheeling.

Obituary

• **J. Wallace Carrel**, vice-president and general manager of the Lodge & Shipley Machine Tool Co., Cincinnati, died on Dec. 16, aged 72 years. He also was secretary and treasurer of the Carlton Machine Tool Co.

A native of Chillicothe, Ohio, Mr. Carrel was a graduate of Hughes High School, Cincinnati. He received his introduction to the industry in 1888 with the old Lodge, Davis & Co., Cincinnati. In 1890 he became manager of the New York branch of the company, then went to Cleveland in a similar capacity for the Davis & Egan Machine Tool Co. After serving with the Charles E. Billin Co., Chicago, and Hill, Clarke & Co., Boston, he returned to Cincinnati in 1902 to become president of the Draper Machine Tool Co. He later rejoined Hill, Clarke & Co. in 1906. In 1907, *American Machinist* sought a man to study conditions in Europe and to report them to the American machine tool industry. Mr. Carrel was selected and served with the publication until Feb. 1, 1909, when he accepted the post of general sales manager for the Lodge & Shipley company. In 1916, he and the late William Lodge and Jack Carlton formed the Carlton Machine Tool Co., with Mr. Carrel as secretary and treasurer, a post which he held until his death. Shortly after, Lodge died, and Murray Shipley, co-owner of the Lodge & Shipley Co., retired from business. In the reorganization which followed, in July, 1917, Mr. Carrel was made vice-president and general manager. Ill health had caused him to be inactive since July, 1940.

• **Harry W. Nichoalds**, pioneer in the automobile parts industry, died Dec. 12 in Chicago at the age of 59. Born in Cassopolis, Mich., Mr. Nichoalds went to Detroit early in the century and opened his first auto supply house in 1908 in Detroit. He invested all of his capital in buying up the output of supply houses and contracting for that of newly formed factories. It was his effort in this direction which was credited in resulting in stabilizing the new industry and in bringing the prices of replacement parts within the reach of

everyone. He left the auto parts business in 1934. In recent years he was widely known in Detroit as manufacturers' agent representing Parker-Wolverine Co., Detroit, the Dura Co., Toledo, and the Ross Gear Co. and the Hancock Mfg. Co., Jackson, Mich.

- **Albert T. Oll**, superintendent and general manager of the leather packing department of the Detroit Oak Belting Co. and formerly one of the owners of the Michigan Leather Packing Co. and the Rockwell Leather Products Co., Los Angeles, was buried Dec. 14, at Detroit. Mr. Oll, who was born in Germany in 1875, had been a resident of Detroit for 49 years.

- **Bruce W. Deacon**, for 11 years Detroit manager for D. A. Stuart Oil Co., selling to Detroit industries, was buried Dec. 13 at Detroit. Mr. Deacon was 57 years old and was one of the oldest industrial oil salesmen in Detroit. Trained as a machinist, he was a tool maker until 1919.

- **A. J. Roby**, of Lansing, Mich., a representative of the Albion Foundry Co., died Dec. 16, in the lobby of the Gilmer Hotel, Jonesville, Mich. He was about 60 years old.

- **Col. Franklin B. Richards**, who was vice-president of the M. A. Hanna Co., Cleveland, and board chairman of the Hanna Furnace Co. before his retirement in January, 1930, died Dec. 30 at his home in Cambridge, Mass. He was 78 years old.

After attending Massachusetts Institute of Technology he launched his career in 1884 as a chemist for the Stafford Mining Co. of North Stafford, Vt. Later he went with an iron and steel company in Youngstown where, in 1888, he became superintendent. After service in Cleveland as manager of ore sales for Tod, Stambaugh & Co., in 1890 he became manager of the Buena Vista Iron Co. of Virginia, with which he was associated until he entered the employ of the M. A. Hanna Co. in 1893. Col. Richards had been vice-president and a director of the Detroit Iron & Steel Co. and treasurer and a director of the United Iron & Steel Co. He had served as a director of the following concerns: The Pennsylvania Iron & Coal Co., the Bonner Iron & Coke Co., the Pittsburgh Ore Co., the Cuyahoga Coal Co. and the Milwaukee Coke

& Gas Co. At one time he was president of the Lake Superior Iron Ore Association, Cleveland.

- **C. Harold Wills**, engineer and metallurgist, an automotive pioneer and founder of the Wills St. Claire Motor Car Co., died in Henry Ford Hospital, Detroit, Dec. 30, after an illness of two days. Mr. Wills founded the Wills St. Claire Co. at Marysville, Mich., in 1920 and at the time of his death was chief metallurgist for the Chrysler Corp. He introduced into automotive use vanadium and molybdenum steels, having been credited with doing much of the pioneering in the use of these alloys while he was chief engineer of Ford Motor Co. Born at Fort Wayne, Ind., 62 years ago, Mr. Wills started to work with Henry Ford as a draftsman when the Ford car was in its experimental stages. He was regularly employed at the time with the Boyer Machine Co. and devoted his evenings to work on the Ford. The Wills St. Claire car was marketed only from 1920 to 1927. Since that time Mr. Wills had devoted his efforts to metallurgical research and owned the patent on Amola steel, now widely used in the automobile industry. Mr. Wills was a member of the American Society of Mechanical Engineers.

- **George S. Fanning**, chief engineer for the Erie Railroad Co., and president of the American Railway Engineers Association, died Jan. 2 in Cleveland after a short illness. Mr. Fanning had lived in Cleveland since July, 1931, when the general offices of the railroad were moved from Passaic Park, N. J. He was 55 years old.

- **Harry T. Gilbert**, special assistant to the president of Republic Steel Corp. in 1930 and general manager of the Midland Steel Products Co. in 1931 and 1932, died Dec. 27 at Pass Christian, Miss. He was 67 years old. His career included service as an executive of the Sharon Steel Hoop Co., Sharon, Pa., and vice-president in charge of sales for Republic Iron & Steel Co. at Youngstown. Mr. Gilbert left Cleveland in 1933 to become sales manager of the Chicago district of Illinois Steel Co. He resigned three years later because of ill health.

- **Albert P. Meyer**, executive vice-president, Pittsburgh Coke & Iron

Co., Pittsburgh, died in that city Dec. 25, at the age of 64. Mr. Meyer was born in Sharpsburg, Pa., and was a graduate of the University of Pittsburgh Law School, class of 1901. After practicing law for a number of years, he entered the iron and steel business and subsequently became associated with the Davison interests, predecessors to the Pittsburgh Coke & Iron Co. which was formed in 1928.

- **Charles W. Cowdrey**, sales manager of the Cleveland Automatic Machine Co., Cleveland, and associated with the company for over 40 years, died Jan. 3 in a Cleveland hospital after an illness of approximately two months. He was 67 years old. A native of Cleveland, Mr. Cowdrey started with the machine tool producing company in its plant, later being advanced to various posts, including testing and sales engineering. Among those surviving him are a son, Chester A. Cowdrey, assistant to the vice-president of Warner & Swasey Co., Cleveland.

- **George A. Preston**, steel foundry superintendent of Ensley steel works, Tennessee Coal, Iron & Railroad Co., Birmingham, from 1923 to 1935, died in Fairfield, Ala., Dec. 28, aged 61 years.

- **William Nettleton**, founder and president of the Nettleton Steel Co., Cleveland, heat treating concern, died Dec. 22.

- **John Gurney Callan**, professor of industrial management at the Harvard business school and an authority on steam turbines, died suddenly on Dec. 31. Born in Northfield, Conn., in 1875, a graduate of Massachusetts Institute of Technology in 1896, where he specialized in electrical engineering, he became associated with the Edison Electric Illuminating Co. of Boston the following year. Later he was with the General Electric Co., Lynn, Mass., experimental departments, associated with Arthur D. Little, Inc., from 1909 to 1915; then helped to organize the General Motor Co. research department, and engineering department of Lee, Higginson & Co. Professor of steam and gas engineering at the University of Wisconsin from 1915 to 1920, he then joined the Harvard faculty. Professor Callan held more than 70 patents on steam turbines and other industrial engines.

Daily Pig Iron Output Drops 3% in December

PRODUCTION of coke pig iron in December totaled 4,414,602 net tons, compared with 4,403,230 tons in November. On a daily basis production in December dropped 3 per cent from that in November, or from 146,774 tons to 142,407 tons in December. The operating rate for the industry also dropped from 97.1 per cent of capacity to 94.4.

Production for the 12 months totaled 46,815,906 net tons and came within a little more than

1940 Production Showed Gain of 32.2% Over Previous Year

half a million tons of the record high of 47,360,320 tons produced in 1929. The gain over last year was 32.2 per cent daily, or from an average daily output of 96,760

tons in 1939 to 127,912 tons in 1940. The operating rate for the year was 84.4 per cent of capacity.

There were 202 furnaces in blast on Jan. 1, operating at the rate of 142,480 tons a day, compared with 201 on Dec. 1, making 148,000 tons. The Tennessee Coal, Iron & Railroad Co. blew out its No. 3 Ensley furnace for relining. Among the furnaces blown in were a Campbell unit of Youngstown Sheet & Tube Co. and Palmerton No. 2 of New Jersey Zinc Co.

Production by Districts and Coke Furnaces in Blast (All Figures in Net Tons)

FURNACES	Dec., 1940	Nov., 1940	Dec., 1939	Jan. 1, 1941		Dec. 1, 1940	
				Number in Blast	Operating Rate, Net Tons a Day	Number in Blast	Operating Rate, Net Tons a Day
New York:							
Buffalo	281,712	270,280	267,348	12	9,085	12	9,010
Other New York and Mass.	39,512	38,614	15,570	2	1,275	2	1,285
Pennsylvania:							
Lehigh Valley ...	122,290	106,112	91,765	6	3,940	6	4,160
Spiegeleisen	9,793	6,326	11,707	2	375	1	210
Schuylkill Valley ..	45,965	49,230	57,044	3	1,485	3	1,640
Susquehanna and Lebanon Valleys ..	42,226	41,280	31,453	2	1,360	2	1,375
Ferromanganese ..	2,962	2,962	2,684	1	95	1	100
Pittsburgh District ..	979,465	929,474	932,987	40	31,595	39	31,460
Ferro. and Spiegel ..	12,207	13,206	15,570	2	395	3	440
Shenango Valley ..	83,031	79,036	80,585	4	2,680	4	2,635
Western Pa.	129,033	123,507	105,168	7	4,160	7	4,115
Ferro. and Spiegel ..	14,349	13,861	15,658	1	465	1	460
Maryland:							
Wheeling District ..	189,039	193,173	196,087	6	6,100	6	6,440
Ohio:							
Wheeling District ..	215,075	191,129	206,472	9	6,940	9	6,615
Ohio:							
Mahoning Valley ..	451,990	452,886	440,298	19	15,040	18	15,095
Central and North-ern	379,033	367,285	334,597	16	12,225	16	12,400
Spiegeleisen	4,758	.....	.....	0	.....	0	.....
Southern	69,090	55,876	63,926	5	2,230	5	2,360
Illinois and Indiana ..	781,826	919,967	822,999	33	25,220	33	30,035
Michigan and Minnesota	142,696	139,893	149,802	7	4,605	7	4,665
Colorado, Missouri and Utah	66,793	66,443	43,014	4	2,155	4	2,215
The South:							
Virginia .....	.....	.....	.....	0	.....	0	.....
Ferromanganese ..	3,362	264	3,546	1	110	1	10
Kentucky	28,465	28,826	29,929	2	920	2	960
Alabama	322,862	306,500	299,131	17	9,935	18	10,235
Ferromanganese ..	.....	.....	3,196	0	.....	0	.....
Tennessee	2,786	2,342	.....	1	90	1	80
Total	4,414,602	4,403,230	4,220,536	202	142,480	201	148,000

Production of Coke Pig Iron and Ferromanganese

(All Figures in Net Tons)

	Pig Iron*		Ferro-manganese†	
	1940	1939	1940	1939
January ..	4,032,022	2,436,474	43,240	23,302
February ..	3,311,480	2,307,409	38,720	20,894
March ..	3,270,499	2,681,969	46,260	17,928
April ...	3,137,019	2,302,918	43,384	12,900
May	3,513,683	1,923,618	44,973	8,835
June	3,818,897	2,372,665	44,631	18,611
½ year ..	21,083,600	14,025,053	261,208	102,470
July	4,053,945	2,639,022	43,341	23,758
August ..	4,238,041	2,978,991	37,003	23,103
September ..	4,176,527	3,223,983	33,024	24,583
October ..	4,445,961	4,062,901	32,270	26,817
November ..	4,403,230	4,166,888	31,155	33,999
December ..	4,414,602	4,220,536	35,666	40,654
Year ..	46,815,906	35,317,374	473,667	275,384

*These totals do not include charcoal pig iron. †Included in pig iron figures.

Daily Average Production of Coke Pig Iron

	% Ca-1940		% Ca-1939		1938
January ..	130,061	85.8	78,596	51.5	51,632
February ..	114,189	75.1	82,407	54.0	51,931
March ...	105,500	68.9	86,516	56.8	52,476
April	104,567	68.6	76,764	50.4	51,376
May	113,345	74.8	62,052	40.8	45,343
June	127,297	83.9	79,989	51.7	39,648
½ year ..	115,844	76.1	77,486	...	48,717
July	130,772	86.3	85,130	55.8	43,417
August ..	136,711	90.4	96,096	62.9	53,976
September ..	139,218	92.2	107,466	70.4	62,737
October ..	143,418	94.8	131,061	85.9	74,147
December ..	142,407	94.4	136,146	89.4	79,872
Year ..	127,912	84.4	96,760	...	57,633

Merchant Iron Made, Daily Rate

	1940	1939	1938	1937	1936
January ...	16,475	11,875	11,911	18,039	11,301
February ..	14,773	10,793	9,916	18,496	12,652
March	11,760	10,025	9,547	18,432	12,131
April	13,656	9,529	9,266	16,259	15,565
May	16,521	7,883	7,203	21,821	14,352
June	13,662	8,527	6,020	17,774	15,914
July	16,619	9,404	6,154	21,962	13,013
August	17,395	11,225	7,408	19,971	13,606
September ..	17,571	12,648	12,550	22,473	14,029
October ...	18,694	16,409	12,095	21,224	15,282
November ...	22,792	16,642	14,793	17,541	16,508
December ...	19,779	16,912	10,226	12,280	16,634

The Iron Age Comparison of Prices

Advances Over Past Week in Heavy Type; Declines in Italics

	Jan. 7, 1941	Dec. 30, 1940	Dec. 10, 1940	Jan. 9, 1940		Jan. 7, 1941	Dec. 30, 1940	Dec. 10, 1940	Jan. 9, 1940
Flat Rolled Steel: (Cents Per Lb.)					Pig Iron: (Per Gross Ton)				
Hot rolled sheets	2.10	2.10	2.10	2.10	No. 2 fdy., Philadelphia	\$25.84	\$25.84	\$24.84	\$24.84
Cold rolled sheets	3.05	3.05	3.05	3.05	No. 2, Valley furnace	24.00	24.00	23.00	23.00
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50	No. 2, Southern Cin'ti.	23.06	23.06	23.06	23.06
Hot rolled strip	2.10	2.10	2.10	2.10	No. 2, Birmingham	19.38	19.38	19.38	19.38
Cold rolled strip	2.80	2.80	2.80	2.80	No. 2, foundry, Chicago†	24.00	24.00	23.00	23.00
Plates	2.10	2.10	2.10	2.10	Basic, del'd eastern Pa.	25.34	25.34	24.34	24.34
Tin and Terne Plate: (Dollars Per Base Box)					Basic, Valley furnace	23.50	23.50	22.50	22.50
Tin plate	\$5.00	\$5.00	\$5.00	\$5.00	Malleable, Chicago†	24.00	24.00	23.00	23.00
Manufacturing ternes	4.30	4.30	4.30	4.30	Malleable, Valley	24.00	24.00	23.00	23.00
Bars and Shapes: (Cents Per Lb.)					L. S. charcoal, Chicago	30.34	30.34	30.34	30.34
Merchant bars	2.15	2.15	2.15	2.15	Ferromanganese†	120.00	120.00	120.00	100.00
Cold finished bars	2.65	2.65	2.65	2.65	†The switching charge for delivery to foundries in the Chicago district is 60c. per ton. †For carlots at seaboard.				
Alloy bars	2.70	2.70	2.70	2.70	Scrap: (Per Gross Ton)				
Structural shapes	2.10	2.10	2.10	2.10	Heavy melt'g steel, P'gh.	\$23.75	\$23.50	\$22.75	\$18.25
Wire and Wire Products: (Cents Per Lb.)					Heavy melt'g steel, Phila.	21.50	21.25	20.75	18.25
Plain wire	2.60	2.60	2.60	2.60	Heavy melt'g steel, Ch'go	20.75	20.75	20.50	16.50
Wire nails	2.55	2.55	2.55	2.55	Carwheels, Chicago	21.75	21.75	21.75	15.75
Rails: (Dollars Per Gross Ton)					Carwheels, Philadelphia	23.25	23.25	23.25	20.25
Heavy rails	\$40.00	\$40.00	\$40.00	\$40.00	No. 1 cast, Pittsburgh	22.75	22.75	22.75	19.25
Light rails	40.00	40.00	40.00	40.00	No. 1 cast, Philadelphia	23.75	23.75	23.25	20.25
Semi-Finished Steel: (Dollars Per Gross Ton)					No. 1 cast, Ch'go (net ton)	19.25	19.25	19.25	14.25
Rerolling billets	\$34.00	\$34.00	\$34.00	\$34.00	Coke, Connellsville: (Per Net Ton at Oven)				
Sheet bars	34.00	34.00	34.00	34.00	Furnace coke, prompt	\$5.50	\$5.50	\$5.25	\$4.50
Slabs	34.00	34.00	34.00	34.00	Foundry coke, prompt	5.75	5.75	5.75	5.50
Forging billets	40.00	40.00	40.00	40.00	Non-Ferrous Metals: (Cents per Lb. to Large Buyers)				
Wire Rods and Skelp: (Cents Per Lb.)					Copper, electro., Conn.*	12.00	12.00	12.00	12.50
Wire rods	2.00	2.00	2.00	2.00	Copper, Lake, New York	12.00	12.00	12.00	12.50
Skelp (grvd)	1.90	1.90	1.90	1.90	Tin (Straits), New York	50.10	50.10	50.10	48.25
					Zinc, East St. Louis	7.25	7.25	7.25	5.75
					Lead, St. Louis	5.35	5.35	5.35	5.35
					Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 93-102 herein. On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Composite Prices

FINISHED STEEL				PIG IRON				SCRAP STEEL			
Jan. 7, 1941	2.261c. a Lb.			\$23.44	a Gross	Ton	\$22.00	a Gross	Ton		
One week ago	2.261c. a Lb.			\$23.44	a Gross	Ton	\$21.83	a Gross	Ton		
One month ago	2.261c. a Lb.			\$22.61	a Gross	Ton	\$21.33	a Gross	Ton		
One year ago	2.261c. a Lb.			\$22.61	a Gross	Ton	\$17.67	a Gross	Ton		
High				High				High			
Low				Low				Low			
1941											
1940	2.261c., Jan. 2	2.211c., Apr. 16		\$23.44, Dec. 23	\$22.61, Jan. 2		\$22.00, Jan. 7	\$16.04, Apr. 9			
1939	2.286c., Jan. 3	2.236c., May 16		22.61, Sept. 19	20.61, Sept. 12		21.83, Dec. 30	14.08, May 16			
1938	2.512c., May 17	2.211c., Oct. 18		23.25, June 21	19.61, July 6		22.50, Oct. 3	11.00, June 7			
1937	2.512c., Mar. 9	2.249c., Jan. 4		23.25, Mar. 9	20.25, Feb. 16		15.00, Nov. 22	12.92, Nov. 10			
1936	2.249c., Dec. 28	2.016c., Mar. 10		19.74, Nov. 24	18.73, Aug. 11		21.92, Mar. 30	12.67, June 9			
1935	2.062c., Oct. 1	2.056c., Jan. 8		17.90, May 1	16.90, Jan. 27		17.75, Dec. 21	10.33, Apr. 29			
1934	2.118c., Apr. 24	1.945c., Jan. 2		18.84, Nov. 5	13.56, Jan. 3		13.42, Dec. 10	9.50, Sept. 25			
1933	1.953c., Oct. 3	1.792c., May 2		17.90, May 1	13.56, Dec. 6		13.00, Mar. 13	6.75, Jan. 3			
1932	1.915c., Sept. 6	1.870c., Mar. 15		16.90, Dec. 5	14.81, Jan. 5		12.25, Aug. 8	6.43, July 5			
1931	1.981c., Jan. 13	1.883c., Dec. 29		14.81, Jan. 5	13.56, Dec. 6		8.50, Jan. 12	8.50, Dec. 29			
1930	2.192c., Jan. 7	1.962c., Dec. 9		15.90, Jan. 6	14.79, Dec. 15		11.33, Jan. 6	11.25, Dec. 9			
1929	2.236c., May 28	2.192c., Oct. 29		18.21, Jan. 7	15.90, Dec. 16		15.00, Feb. 18	14.08, Dec. 3			
Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.				Based on average for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.				Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.			

Summary of the Week

THE most drastic action on prices that has been taken by a governmental authority since 1917-18 is the notice served on the iron and steel scrap trade by the Price Stabilization Division of the National Defense Advisory Commission that prices must be reduced to a level not to exceed \$20, Pittsburgh, for No. 1 heavy melting steel by voluntary action or government price control will be recommended.

During the past week scrap prices have continued the upward trend of previous weeks. Advances of 50c. to \$1 a ton have occurred in a number of districts, but on Tuesday there was a stoppage of transactions pending the expected downward adjustment of prices. Reflecting the situation up to the time of the Defense Commission's statement, THE IRON AGE scrap composite price had advanced 17c. over last week to \$22. Events clearly foreshadow a decline during the coming week.

No mention was made in the government statement of any grade other than No. 1 heavy melting steel at Pittsburgh, which suggests that a system of differentials between districts and between grades may have to be worked out similar to that which prevailed during the price fixing era of 1917-18. On the basis of Tuesday's quotations, No. 1 heavy melting steel at Pittsburgh was \$3 above the Chicago average and \$2.25 above Philadelphia.

THE concern of the Price Stabilization Division of the National Defense Commission over scrap prices has to do also with the question of steel prices, which might be forced upward if costs go too high either through raw material advances or wage rises.

This is the first time that the Defense Commission has really made any dictatorial attempt to control prices, its previous efforts having been confined to persuasion. The legal authority to establish war-time price fixing, if that should be found necessary, might be derived from the "Draft Industry" law passed by Congress last summer.

That more power for governmental authority will be provided by this sentence from President Roosevelt's message to Congress: "Whatever stands in the way of speed and efficiency in defense, in defense preparations at any time, must give way to the national need."

Next on the agenda of the Defense Commission is a report on steel capacity, which President Roosevelt said last week would be forthcoming soon. Tentative studies made for the Commission indicate a total demand for steel ingots in 1941 of 93,500,000 tons, or fully 10,000,000 tons in excess of the country's extraordinarily high capacity, but such estimates are based on all civilian requirements being carried on a

• Price Stabilization Division of Defense Commission "orders" reduction of scrap prices . . . Government control threatened as alternative . . . Defense orders play increasingly prominent part in rising steel volume . . . 1940 ingot output 65,246,953 tons, pig iron 46,815,906 tons.

greatly accelerated rate because of greater consumer buying power. Up to this time the government has made no formal request of the steel industry for enlarged capacity except in a few special instances, such as electric furnace steel.

STEEL ingot production this week has risen a half point to 97½ per cent, the highest in percentage and tonnage since the war began. Total production of open hearth and bessemer steel in 1940, as reported by the American Iron and Steel Institute, was 65,246,953 net tons, an all-time record which was 7 per cent above the 1929 output and 26 per cent over that of 1939. Even now some individual steel plants are not operating at full ingot producing capacity. The abandoned and high cost Pencoyd, Pa., plant of the American Bridge Co., idle for some years, will be put back into service Feb. 1 by Carnegie-Illinois Steel Corp. The plant's ingot capacity is 268,000 net tons annually.

Pig iron production in 1940 totaled 46,815,906 net tons, according to THE IRON AGE calculations. The December total was 4,414,602 tons compared with 4,403,230 tons in November. On a daily basis, output dropped 3 per cent last month, or from 146,774 tons to 142,407 tons in December. As of Jan. 1 there were 202 furnaces in blast, a gain of one during the month preceding.

Defense orders continue to play an increasingly prominent part in a volume of steel business which exceeds shipments, piling up larger backlogs and lengthening deliveries still further. The 200-ship program to be carried out by the Maritime Commission will take about 600,000 tons of steel, much of which will be fabricated by structural steel shops, which have ample surplus capacity for such work.

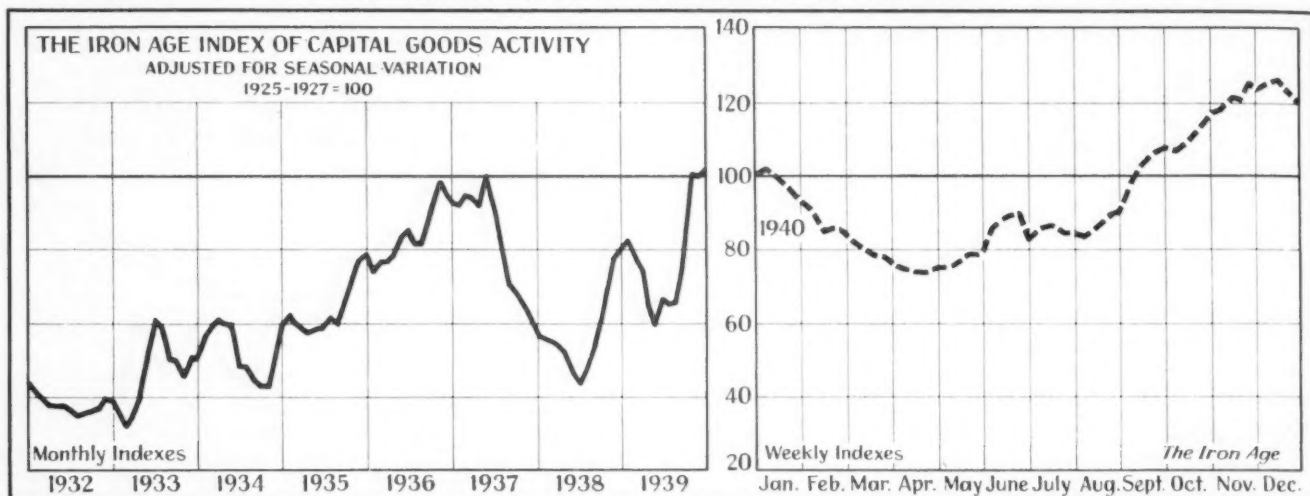
Another merchant pig iron producer, the Mystic Iron Works of Everett, Mass., has put into effect an advance of \$1 a ton.

The Industrial Pace . . .

DECLINING moderately in the week ended Dec. 28, as a result of holiday shutdowns, The Iron Age index of capital goods activity extended its downward movement in the past week to 120.4, the lowest point at which the index has been since the week ended Nov. 9. Losses in two components were responsible for the decline. The automobile series was off sharply from 127.3 to 106.3, reflecting a decided drop in assemblies from 125,370 in the week ended Dec. 21, to 76,690 in the past week. The lumber carloadings component fell to 67.7 from 86.5 in the preceding week.

Freight carloadings in December, estimated on a weekly basis, show a decline from November levels. Cars loaded in December totaled about 2,900,000, as compared with 3,800,000 in November. New orders received by manufacturers in November reached a new high for the second consecutive month, while inventories showed the largest increase since the heavy buying following the outbreak of war in 1939. The index measuring new orders reached 208 in November, as compared with 198 in October. Inventories stood at 124.7, an increase of two points over October.

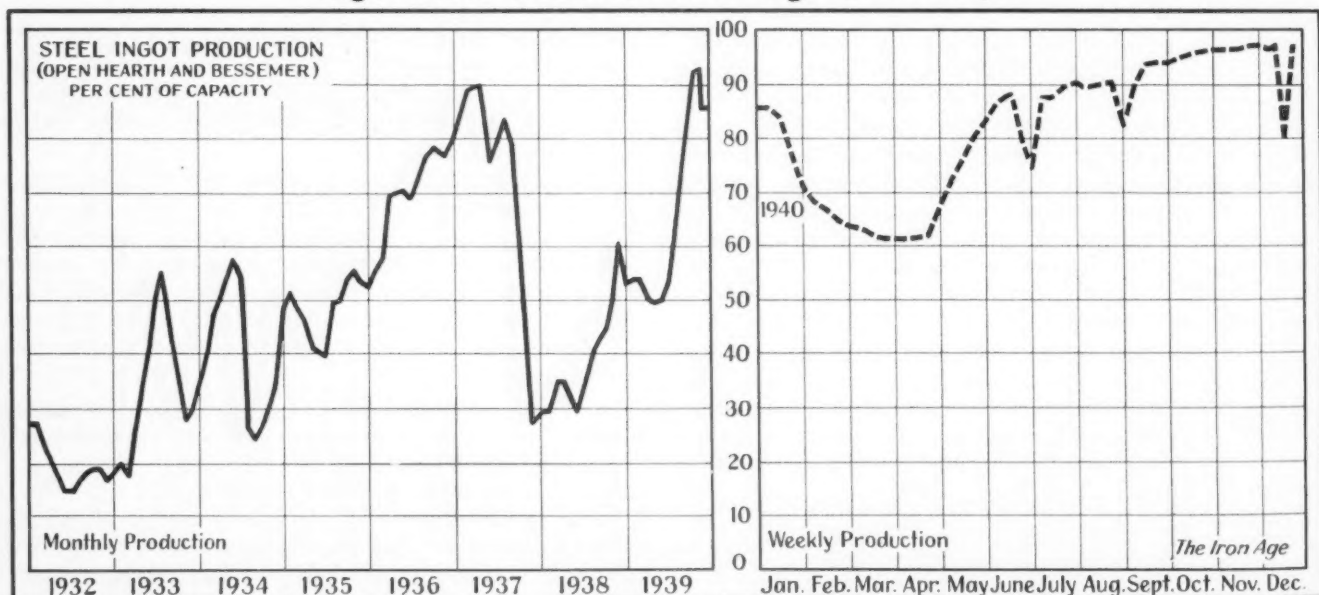
Index Declines 7 Points In 2 Weeks



Component	Week Ended	Jan. 4	Dec. 28	Dec. 7	Jan. 6	Jan. 5
Steel ingot production ¹		138.2	115.3	142.3	124.2	121.9
Automobile production ²		106.3	127.3	119.9	116.4	111.5
Construction contracts ³		161.6	159.6	153.3	84.7	111.5
Forest products carloadings ⁴		67.7	86.5	79.9	56.5	127.8
Pittsburgh output and shipments ⁵		128.4	128.0	126.7	118.9	121.0
COMBINED INDEX		120.4	123.3	124.4	100.1	118.7

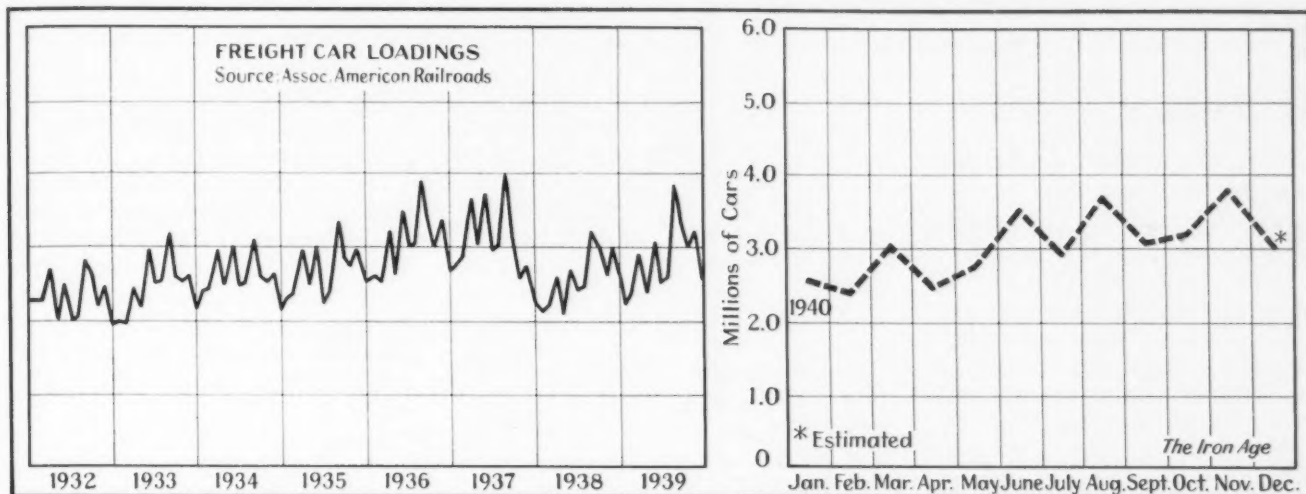
Sources: ¹THE IRON AGE; ²Wards Automotive Reports; ³Engineering News-Record; ⁴Association of American Railroads; ⁵University of Pittsburgh. Indexes of forest products carloadings and activity in Pittsburgh area reflect conditions as of week ended Dec. 28. Other indexes cover week of Jan. 4.

Ingot Rate Reaches New High at 97.5%

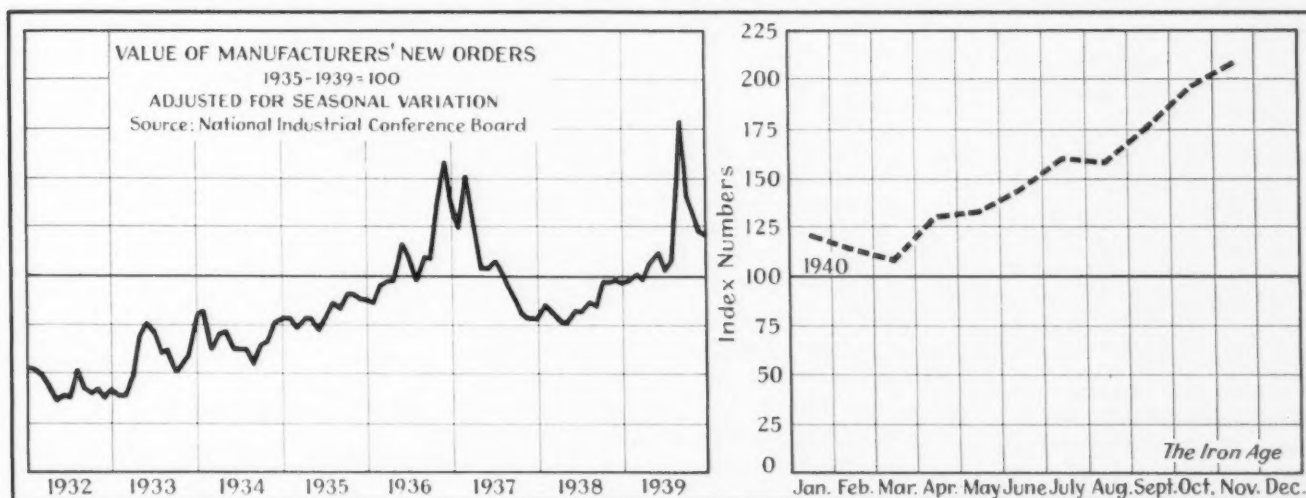


District	Ingot Production, Per Cent of Capacity	Pittsburgh	Chicago	Valleys	Philadelphia	Cleveland	Buffalo	Wheeling	Detroit	Southern	S. Ohio	Western	St. Louis	Eastern	Aggregate
Current Week		98.0	99.5	98.0	94.0	91.0	104.5	104.0	97.0	94.0	101.0	82.5	102.5	90.5	97.5
Previous Week		98.0	99.5	95.0	94.0	90.0	106.0	104.0	95.5	94.0	100.5	87.5	102.5	89.5	97.0

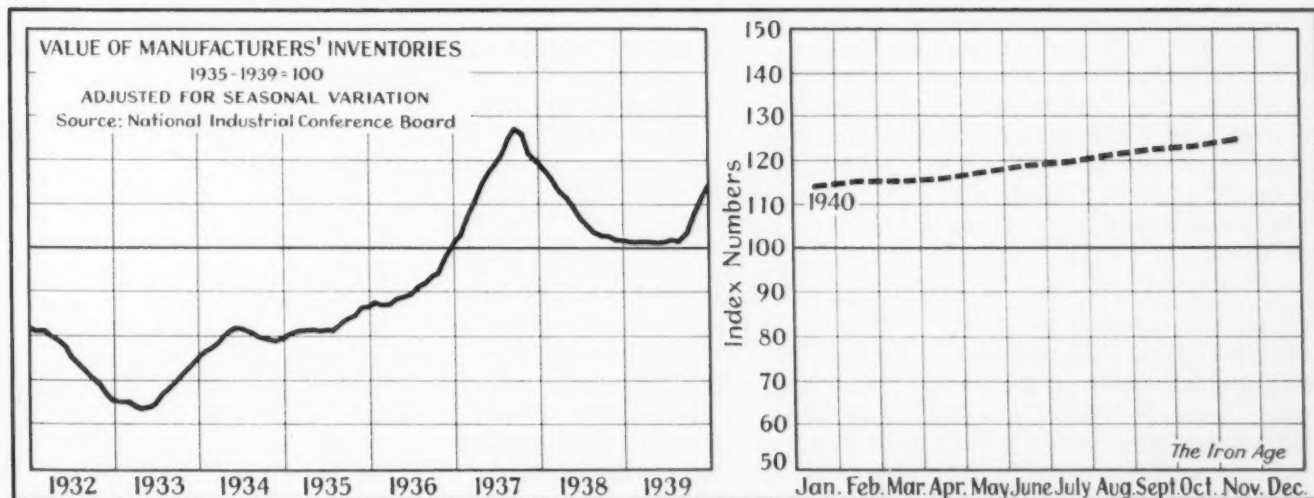
Weekly Freight Movement Eases in December



Manufacturers' November Orders Touch New High



November Stocks Show Biggest Gain Since 1939



Market News

...THE WEEK'S ACTIVITIES IN IRON AND STEEL

New Business

... No slackening in orders except for the holidays

Although incoming business at PITTSBURGH this past week continued to be affected by year-end influences, the total volume was, nevertheless, almost equal to actual production and shipments. An incoming rate approximating the level of preholiday weeks is expected by the end of this week. PITTSBURGH notes that auto buying of steel has not slackened and it appears that unless some unforeseen development occurs, automotive companies will take as much steel this quarter as they did in the final 1940 quarter. Miscellaneous demand shows little or no evidence of declining at PITTSBURGH and national defense requirements are increasing.

Inquiries for steel at CLEVELAND have been very brisk since the start of the year, and daily tonnage bookings of some sales offices are two to three times normal despite greatly extended promises on deliveries. Orders are above production, but current consumption is close to production.

The production load remains uneven. Certain types of rolling mill equipment, notably in the heavier classifications, are overloaded. Annealing facilities provide limitations at many plants.

All CHICAGO steelmakers swing into 1941 with record-breaking backlogs and no indication of slackening in sight. Deliveries pursue a lengthening course and pressure for shipments grows more intense. At some mills reservations for July and August are sought by non-defense manufacturers. Those with defense business are being accommodated with reasonable promptness.

The holiday lull did not affect business in that district materially. Where December was a little below November for most producers, with the exception of one principal mill, all started January with a "bang." Orders are well diversified with

carbon and alloy bars holding an edge over sheets and plates. Much of the defense business is really opening up—two shell steel inquiries for 10,000 and 21,000 appearing during the week, and one bar inquiry for submarines amounting to well over 10,000 tons is also making the rounds. As various defense projects come out of the blue-print planning stage more and more steel will be purchased for these items. The situation on structural steel and on plates is noticeably tighter and bearing piling continues on a heavy scale while sheet piling has experienced a dip.

Home appliance manufacturers still provide CHICAGO mills with strong volume, as do heavy machinery manufacturers and forgers. Many regular steel consumers there have the biggest backlogs in their history.

Bookings at BIRMINGHAM are holding up well following an influx of orders during December that approximated volume for the record month of November in that district. Orders continue to exceed shipments for most products.

With immediate needs now reasonably well provided for, EASTERN PENNSYLVANIA consumers have been looking farther into the future in their buying policies, with the result that producers are still faced with a fresh volume of orders that shows almost no letup from that prevailing in the last quarter. Mills generally are scrutinizing specifications with an eye to discouraging excessive purchasing for stock. Although bar demand has eased slightly, sheet, shape and plate specifications continue at the same levels. Sheet mills can offer no delivery before April. Defense construction holds structural mill operations at capacity levels.

The flow of new orders, which slackened somewhat during the last two weeks of December has resumed its previous pace at BUFFALO, where steel plants write up the heaviest backlog in the history of the steel industry in that area. New orders for structural steel are not falling off as they have in

some districts; deliveries of this item now extended from eight to 10 weeks.

Steel producers in SOUTHERN OHIO note that during the past week there was a sharp demand for heavy bars. This is largely from the influence of the current defense efforts. Otherwise new business is following virtually the same pattern as was established early in the fourth quarter.

National defense construction is likely to give way to shipbuilding as the leading Pacific Coast tonnage consumer during 1941. Although defense construction contracts are still increasing in number, a marked tendency to temporary construction using little steel, rather than the permanent type which has been a heavy consumer in recent months, is noticeable. The buying peak on defense construction contracts already underway should be reached in about 90 days, it is estimated. Coast rolling mills with one exception are working at capacity, but in most cases backlogs are not burdensome, and no difficulty should be experienced in handling local demand.

Steel Operations

... Ingot rate rises this week to 97½ per cent, a new high

Of the 13 steel producing districts in the United States, four are operating at higher than 100 per cent of practical capacity, four others at above 95 per cent but below 100 per cent, while the remainder, with one exception (the western district) are above 90 per cent. There are a number of individual steel plants which are not running full in steel making, but this situation probably will be changed before long. Some that have ingot capacity in excess of finishing capacity probably will be called upon to furnish ingots for the British or for other mills.

The average of the industry's operations this week is computed by THE IRON AGE at 97½ per cent, up half a point over last week, and a new high both on a percentage basis and a tonnage basis.

Prices

... Extras on hot rolled bars and strip revised

Carnegie-Illinois Steel Corp., by revising its list of extras on hot rolled carbon steel bars and hot rolled strip has reduced the minimum thickness on bar flats 6 in. wide and narrower, from $\frac{1}{4}$ in. (0.250) to $\frac{13}{64}$ in. (0.203) and has reduced the maximum thickness of hot rolled strip 6 in. wide and narrower from 0.2499 in. to 0.202 in.

The moving of the demarcation point between bars and strip of 5 x 6 in. and narrower from a thickness between 0.2499 and 0.250 in. to between 0.202 and 0.203 in., according to the company, more properly classifies materials rolled on the bar and strip mills. This change also precludes the substituting of hot rolled strip 0.2499 in. thick for bar flat stock $\frac{1}{4}$ in. thick.

New size extras have been set up which will govern the new thickness item on the hot rolled bar card.

Coke

... Further expansion of by-product capacity planned at Buffalo

The Donner-Hanna Coke Corp. has announced that it will build 55 new coke ovens at Buffalo, subject to approval at Washington.

Total coke production in December, according to the U. S. Bureau of Mines, was 5,129,400 net tons compared with 4,262,600 tons in November. The 1940 total was 52,907,500 net tons compared with 52,931,300 tons in 1939. Beehive coke production last year was 2,883,500 tons against 1,144,300 tons in 1939.

Railroad Buying

... Rail orders for 1941 delivery total about million tons

The new year begins with heavy orders in rails amounting to 62,000 tons. The Virginian Railroad has ordered 18,000 tons, distributed as follows: 15,000 tons to Bethlehem and 3000 tons to Carnegie-Illinois Steel Corp. Kansas City Southern has ordered approximately 5000 tons of rails divided between Carnegie-Illinois Steel

Corp. and Inland Steel Co. The Burlington recently placed approximately 39,000 tons of rails, distributed as follows: 17,000 to Carnegie-Illinois Steel Corp.; a like amount to Colorado Fuel & Iron Corp., and 5000 tons to Inland Steel Co. Almost 1,000,000 tons of rails have been ordered for 1941 delivery. Approximately 15 per cent of this tonnage has been shipped and the balance will probably be delivered some time between January and September this year.

The New York Central announces the purchase of 95 passenger coaches and 1000 box cars in addition to the 36 diesel-electric switchers which were reported in THE IRON AGE of Jan. 2. Forty-five passenger coaches will be built by the Pullman Standard Car Mfg. Co., 25 by American Car & Foundry Co. and 25 by the Presses Steel Car Co. Despatch Shops, Inc., will build the 50-ft. box cars.

St. Louis San Francisco Railway asked federal court authority to spend \$2,043,681 in 1941. This will pay for 71 miles of track, repairs to locomotives, rebuilding of 400 freight cars and two 44-ton diesel switching locomotives.

Diesel-electric switching locomotive purchases included 12 units bought from the American Locomotive Co. Of these, three were ordered by the South Buffalo, two by the Newburgh & South Shore and one each by the American Steel & Wire Co., Youngstown & Northern, Messena Terminal, Inland Steel Co., Birmingham Southern, River Terminal and by Texas Pacific-Missouri Pacific. General Electric Co. received orders for three diesel-electric switchers.

Domestic freight car orders placed in 1940 amounted to 65,294 cars, December orders having been 6365 cars. Distribution of total cars placed for 1940 is as follows: own shops, 17,261; American Car & Foundry Co., 11,556; Bethlehem Steel, 3025; General American, 4092; Greenville Steel Car, 1425; Magor Car Co., 625; Mount Vernon Car Mfg. Co., 1980; Pressed Steel Car, 6553; Pullman Standard Car, 16,315; Ralston Steel Car, 1250; Virginia Bridge, 1050; others, 162.

According to a review made by *The Railway Age* total railway pur-

chases in 1940 amounted to more than a billion dollars and exceeded corresponding expenditures of any year since 1929. Equipment purchases in 1940 totaled \$233,374,000, exceeding 1939 by almost fifty million dollars and 1938 by more than 160 million dollars.

Pig Iron

... Considerable business has been done at recent \$1 advance

Merchant blast furnaces which recently put into effect an advance of \$1 a ton in pig iron prices have done a substantial amount of business, in some instances being sold out for the first quarter. Other producers who have not advanced prices have limited their selling to a matter of allocating tonnages to regular customers on the basis of their normal takings, and these sales have generally been on a price in effect at time of shipment understanding. The Mystic Iron Works, merchant producer at Everett, Mass., announced on Tuesday that it had advanced its prices \$1 a ton.

Pittsburgh reports supplies relatively tight, especially steel-making iron. Some non-integrated and at least one integrated steel mills are inquiring for steel-making iron. Major steel companies, part of whose output of iron goes into merchant channels, have cut down considerably on the amount of tonnage they are willing to place on order books for their merchant customers. Some premium over and above the present going price on pig iron would not be surprising but the anxiety and excitement on the part of some pig iron consumers could bring about the precise situation which they fear. No actual shortage of iron exists at the moment, most of the apprehension being over the availability of future supplies.

No price advance has yet been announced at Birmingham and there is no opposition in some quarters to an advance, at least for the present. One producer is selling an occasional car for spot shipment to non-contracting customers without price change. This producer will sell tonnages for future shipment, however, only at prices in effect at time of shipment.

Some Eastern Pennsylvania sell-

ers are practically out of the market for first quarter iron, while others are paring commitments to a minimum in an effort to meet the legitimate needs of as many consumers as possible.

Reinforcing Steel

... Two weeks' awards total 22,665 tons

Reinforcing steel awards of 22,665 cover the past two weeks. Sizable awards are 7000 tons for an ammunition loading plant in Laporte County, Ind.; 6000 tons for a shell loading plant at Burlington, Iowa; 2300 tons at San Pedro, Cal., for a Navy fleet operating base; 1700 tons at Philadelphia for a warehouse for the Marine Corps, and 1000 tons for an ammunition loading plant at Wilmington, Ill.

New reinforcing steel projects for the past two weeks total 25,280 tons.

Shipbuilding

... Structural fabricating shops will aid in ship program

The plan to be used in building 200 merchant ships for the U. S. Government is apparently somewhat similar to the original idea which the British considered for the building of 60 ships placed in this country and reported in THE IRON AGE several weeks ago. As reported at the time, considerable thought had been expended on the fabrication of ship parts in fabricating plants throughout the country, the material to subsequently flow to a coastal point where final assembly would be made.

Appropriations totaling \$315,000,000 for increasing shipbuilding facilities and \$194,000,000 for expanding naval ordinance production were proposed in a bill introduced in Congress on Monday by Chairman Carl Vinson of the House Naval Affairs Committee. Suggested by the Navy as additional means of speeding up the defense program, the measure will be the subject of public hearings which, Mr. Vinson said, will start "right away."

Bethlehem Steel Co. was the apparent low bidder when the Maritime Commission opened bids Monday for the construction of eight C-2 cargo vessels. The company bid \$2,620,000 for each ship. Tampa (Fla.) Shipbuilding Co. bid

\$2,633,500. The C-2 ship required an estimated 3600 tons of steel.

The Maritime Commission has awarded a \$4,375,000 contract to the Consolidated Steel Corp., Ltd., Los Angeles, for the construction of two marine transports.

Plates

... Orders continue in heavy volume and deliveries lengthen

The National Defense Advisory Commission has adopted definitions of plate sizes to facilitate its discussions with plate manufacturers and others. Plates are divided into three groups: Those 100 in. and under; wide plates, over 100 in. and under 144 in.; extra wide plates, 144 in. and over.

Tanks, railroads, some shipbuilding, and other defense orders held by CHICAGO manufacturing concerns are coming out with steel orders in increasing quantity. The delivery situation on plates of most sizes is lengthening and many defense projects calling for this item are being delayed because of changing specifications. Makers of water tanks and other non-defense manufacturers are also providing a steady demand.

Inquiries continue very numerous at CLEVELAND and YOUNGSTOWN, where heavy plates are very greatly extended and even some lighter sizes are into second quarter. Repairs to Great Lakes vessels are accounting for a little business.

Eastern Pennsylvania producers are, with one or two exceptions, practically sold out for first quarter.

Semi-Finished Steel

... Orders outrun shipments ... supplies are very tight

With fresh orders still outrunning both shipments and production, and the latter remaining at capacity level, no letdown in the volume of bookings is expected for some time to come. Although no formal priorities have been placed on British requirements, most steel mills are and have been voluntarily giving British orders this treatment. Specifications from the British were slow in materializing during December but this condition is expected to be bettered in January.

Wire rods are being sold only to the regular trade by one of the leading CLEVELAND producers. Order backlogs are very large, particu-

larly for alloy rod where demand has been intense recently.

Merchant Bars

... Demand still extremely heavy ... shell steel orders appearing

Some slackening in demand has occurred within the past week but is due entirely to year-end influences which will run their course by the end of this week, according to PITTSBURGH reports. It has been definitely established that barring unforeseen development, the automotive industry is expected to take fully as much steel during the first quarter of this year as in the last quarter of 1940. This outlook is considerably better than had been expected a few months ago and is brought about by the tremendous activity in new car sales. Miscellaneous demand is strong and deliveries remain somewhat extended. Extra changes on hot rolled carbon steel bars are explained under "Prices."

Demand has failed to slacken at CLEVELAND, where some bar mills face uninterrupted schedules well into second quarter.

With carbon and alloy bars the strongest items with all CHICAGO steelmakers, many customers are shopping around with their orders. A submarine contractor has an inquiry out for more than 10,000 tons.

Wire Products

... Defense projects take fencing and nails

PITTSBURGH reports the movement of merchant wire products for spring demand somewhat better than had been expected. Wire makers hope to fare considerably better in farm regions than was the case last year when considerable farm purchases were blotted out owing to extreme weather conditions. Paced by automotive requirements, manufacturers' wire demand is exceptionally active with all manner of miscellaneous customers fairly well represented on order books. Wire rods are not plentiful and some customers anxious about future requirements continue to "shop around."

Wire drawing at CLEVELAND continues at a very strong rate with backlogs in the manufacturers' division exceptionally high and demand for stainless wire rising constantly. The merchant end of the

business entered 1941 with unusually large backlogs of coarse nails. Probably 30,000 tons of nails have been required for cantonments and heavy additional tonnage will arise from housing programs for defense plant workers.

CHICAGO wire producers found December about the strongest month in 1940 and January started off on an even stronger pace. All of the wire fence for the four loading plants at Burlington, Iowa; Elwood and Wilmington, Ill., and Union Center, Ind., went to Cyclone Fence Co. The Union Center project called for a 22-mile fence. Fencing is particularly active in that area.

Tin Plate

... Better demand comes from general line can makers

A slight betterment has occurred in the export tin plate outlook with moderate sized specifications emanating from points other than the European continent, chiefly Portugal. The volume of domestic business is featured by a relatively strong demand from general line can makers which obviously reflects the increase in general business activity. Practically all tin plate makers except an upsurge in fresh orders this month predicated on the belief that consumer interests have again become apprehensive over the probability of formal priorities. This market condition, if it should come to pass, would probably be a repetition of last spring when many tin plate consumers stocked up somewhat more material than their current operations called for. Cold reduction tin plate mills are operating at approximately 78 per cent this week. The overall tin plate activity rate, usually reported here, has been eliminated for the time being at least as it was predicated in part on inclusion of hot mill capacity located at large steel plants which if operated again at all would only be during a period in which a heavy tin plate demand would completely utilize all existing cold reduction equipment.

Warehouse Business

... Price adjustments on flat rolled products in East

Some of the warehouses in the New York metropolitan area and

also in Philadelphia and Boston have adjusted prices on galvanized sheets and some other flat rolled items in line with current mill quotations. It is explained that prices of these items were reduced last spring in line with the \$4 a ton reduction by mills, but that until now they have not been brought up into line with the mill quotations.

Tubular Goods

... All-time shipping record attained by one producer in 1940

The pipe market at PITTSBURGH is devoid of outstanding developments. Oil country goods demand is relatively slow and activity has leveled off slightly in the merchant pipe market, jobbers having increased their stocks considerably within the past 30 days. Adherence to published prices can be termed the best in years.

Shipments of leading OHIO tubular goods mills during 1940 were heaviest of any year in recent history, and in the case of one producer established an all-time record. Large pipeline awards early in 1940, followed by heavy purchases of standard pipe for government defense construction projects were the principal factors. Shipments to the oil country in 1941 are expected to be close to the 1940 level.

Bolts, Nuts and Rivets

... Defense orders now coming in ... Total specifications heavy

Railroads are consuming a heavy volume of track bolts taken from CHICAGO mills. Jobbers' purchases are also bulky. The four loading plants in Indiana, Illinois and Iowa provided CHICAGO producers with orders for 240 tons of track bolts for the tracks that will be laid there.

At CLEVELAND actual specifications in December were ahead of those of November.

Structural Steel

... Defense work continues to stimulate market

Fabricated structural steel awards dropped to 33,900 tons from 44,260 tons last week. Outstanding lettings include 7200 tons at Canton, Ohio, for a plant for the Westinghouse Electric & Mfg. Co.; 5500 tons at Ogden, Utah, for Army warehouses at Hill Field; 5000 tons

for an ordnance plant at Louisville, Ky.; 3670 tons at Brooklyn for a section of an elevated parkway; 3170 for state bridges at Winona, Minn.; 2000 tons at Philadelphia for an armor plate machine shop for the Midvale Co., and 1600 tons at Ravenna, Ohio, for an inert storage building for an ammunition loading plant.

New structural steel projects advanced to 48,500 tons from 45,050 tons a week ago. The largest inquiries are 30,000 tons at Charleston, W. Va., for a naval ordnance plant; 3420 tons for heavy and light framing for an ordnance plant at Wilmington, Ill.

Sheets and Strip

... Deliveries being quoted now for second quarter

The automotive industry is ordering steadily at approximately the same rate as in the final quarter of 1940. Household appliance interests are specifying freely and some PITTSBURGH mills are quoting second quarter deliveries at mills' convenience on hot rolled sheets. Average deliveries on hot rolled sheets are currently running from 8 to 10 weeks with the same setup on cold rolled sheets.

With capacity tightly scheduled for weeks ahead, lively demand persists at CLEVELAND for hot and cold rolled sheets and plates. Cold strip mills also face large backlogs, some recent promises for delivery having been as extended as 22 to 24 weeks at CLEVELAND. Annealing capacity, even though operating at 21 turns per week, continues to limit rollings at some plants where 15 turns per week are sufficient to keep annealing facilities heavily engaged.

Deliveries on hot and cold rolled sheets and on galvanized sheets have lengthened a week at CHICAGO. Exceptionally strong demand for sheets from home appliance manufacturers continues with no indication of a letdown. One stove manufacturer ordered close to 5000 tons last week. Defense contractors there are getting in sheet orders in good volume. Backlogs in sheets approximate two to three months for most mills who are meeting a strong diversified demand. One mill finds the call for flat rolled products second only to that for merchant bars.

Machine Tools

... SALES, INQUIRIES AND MARKET NEWS

Year Starts With Big Backlogs

Cleveland

••• Producers here entered 1941 with the largest order backlogs in history and with the next few months booked fairly solid with priority business. This means that Navy work, airplane motors and the 22-mm. machine gun are being shoved ahead.

On top of the record business on the books, there are numerous very large projects just coming to a head. Announcements of the past week gave some indication of the number of new airplane engine plants which are approved. In addition there are other projects like the large plant at Cantor, Ohio, for which equipment is being purchased. Then, too, such companies as Thompson Products, Lima Locomotive and others here are in the market in a big way.

All in all, there may be some armament contract holders who will be disappointed to find that their progress is slower than expected during 1941.

Late last week leaders in the industry were hopeful that more power would be given Mr. Knudsen to follow through on Army and Navy contracts, decide priority rights and other regulations. The industry was looking forward to an important closed meeting at Washington, Jan. 7.

Year Closed on High Note

Cincinnati

••• The closing weeks of 1940 continued the brisk pattern of machinery demand that had prevailed through the greater portion of the year. Production schedules are still being studied in an effort to increase output during the current year, while plants with building programs are pressing them to completion as rapidly as possible to assure further increase in production.

The draft, however, has become a rather important problem in the labor situation. Manufacturers are considering some solution of the question of keeping skilled men at work in the face of possible early calls of some of their men. In fact, with another call

for men for the Army imminent, the industry has been considering ways and means of preserving its forces of skilled men and is pointing out that some help should be given in this regard because of government insistence upon increasing production.

1942 Auto Programs Doubtful

Detroit

••• This is the time when consideration should be given to equipment for new model automobiles but this year proves the exception. No 1942 tooling programs have been outlined yet, although design departments are progressing with proposed new models. The hold-up, of course, is the question whether new models will be feasible at the usual time with the defense program promising to tie up all available equipment and possibly to interfere in other ways with automotive schedules. About to start tooling programs are Studebaker and Buick, which have been announced as prospective manufacturers of airplane engines. More than \$50,000,000 has been allocated to the two plants for new facilities. Both have been engaged for some time in preliminary studies of the equipment that will be required and are now giving the go-ahead to various suppliers.

An active procurement campaign for more than \$2,000,000 worth of equipment for munitions manufacture in the Toledo plant of Willys-Overland Motors, Inc. is underway. Willys recently was awarded an order for \$6,000,000 of shell and shell hoists for the Navy, the order swelling to \$18,000,000 the national defense business already booked by the company. Willys also is expected to use its forging plant to produce aluminum forgings for the aircraft industry, if negotiations now underway are successful. Toledo Scale Co. at Toledo, pressed by demand for aeronautical wind tunnel equipment and automatic weighing equipment for munitions plants, has announced a 65,000 sq. ft. addition to its year-old plant, costing \$100,000. It will be purchasing equipment for this extra floor space shortly.

Defense Plant Corp. Takes Title to Government Tools

New York

••• Title to all machine tools bought with federal funds for defense industries is being vested in the newly formed Defense Plant Corp. Machinery ordered for this purpose in recent months is now being reordered by the particular companies involved in behalf of and for the interest of the D.F.C. Special federal bills of lading are being prepared for use of manufacturers shipping such machinery, which will be tagged with a federal nameplate. Some dealers have hesitated to acknowledge the new orders in view of the formidable amount of conditions of sales printed on the back side of the order. Among other things, these conditions permit cancellation of the order should the supplier fail to meet the delivery date promised. Upon refusal to accept this condition, however, this clause has been struck out by one buyer.

There was somewhat of a lull in buying over the holidays, but renewed purchasing took place the latter part of last week. One of the most active accounts in New York is the maker of the Norden bomb sight, once said to have rated an AA-1 priority, but now bearing an A-1-B rating under the revised system of priorities. Turbines for the Navy have a similar rating. To the machine tool builders and gage makers is given the A-1-A rating, whereas aircraft engine builders have been relegated to third place. The British, while given no official priority rating, are being given every consideration and are beginning to anticipate the purchase of machine tools for their account by the United States government.

It is believed here that the surface has hardly been scratched, as far as the placing of contracts for shell machinings, large caliber guns and other ordnance items are concerned. Millions of dollars worth of shell turning equipment will probably be sold in this territory within the next few months.

Non-Ferrous Metals

MARKET ACTIVITIES AND PRICE TRENDS

New York, Jan. 7—Greater activity characterized all major non-ferrous markets in the past week, as the new year opened. The copper market strengthened on the basis of stronger demand, lead buyers began at rather a brisk rate to fill February needs, demand by tin plate manufacturers created a fair amount of interest in the tin market, and zinc consumers continued to take all tonnages they could obtain. The problem of supply continued dominant in the copper and zinc market. Producers' prices of all metals were unchanged.

Producers of electrolytic copper continued to quote 12c. a lb., delivered Connecticut Valley, and to allot the red metal in accordance with consumers' needs. A continuance of the recent firmer trend in the custom smelter markets was noted, however, when these factors raised their prices $\frac{1}{8}$ c. further to 12.50c. a lb. for both first and second quarter delivery. The export market was quoted at 10.25c. to 10.75c. a lb. f.a.s., with some activity reported.

Zinc

Straining to produce all the zinc possible by pushing the operation of present facilities to the utmost, producers continued to allocate tonnages in the past week, giving preference, as usual, to the most hard-pressed consumers. No change is expected in the present picture until additional capacity, now under construction, can be put into operation. Output will be increased by enough to equal demand, it is estimated, by about the middle of this year. Sales in the past week totaled 5750 tons of prime Western and brass special, while shipments were lower at 4849 tons. Order backlogs now stand at 121,409 tons.

Lead

February books were opened Thursday and brisk interest on the part of buyers has filled that month's requirements to the extent of about 40 per cent. About 10 per cent of January's needs are

still to be accounted for. Sales during the past week were heavy, being in much better volume than that of the previous period. Most of the sales were transacted on an average price basis, while quoted prices were firm at 5.50c. a lb., delivered New York.

Tin

A distinct improvement was noted in the market during the past week when tin plate producers entered the market to fill first quarter requirements at prices corresponding to the government buying level. Purchases were in fairly good volume. The Navy Department purchased an additional 365 tons on Friday on the same basis, to be delivered within 60 days. Purchases by the Navy during the past few weeks now total about 1000 tons. Prompt

Straits metal was quoted throughout the week at 50.10c. a lb., delivered New York, while futures sold for 50.05c. Arrivals of tin in this country in December, more than twice the estimated volume of consumption, were the highest for any month on record, being more than 14,000 tons.

December Averages

Average prices of the major non-ferrous metals in December, based on quotations appearing in THE IRON AGE, were as follows:

	Per Lb.
Electrolytic copper, Conn. Valley	12.00c.*
Lake copper, Eastern delivery	12.00c.
Straits tin, spot, New York	50.11c.
Zinc, East St. Louis	7.25c.
Zinc, New York	7.64c.
Lead, St. Louis	5.35c.
Lead, New York	5.50c.

*Mine producers only.
(Non-ferrous prices on page 97)

LOW-TEMPERATURE-MELTING ALLOYS that increase manufacturing profits



CERROMATRIX

(Melting Temp., 250° F.)
For securing punch and die parts, anchoring machine parts without the expense of a drive fit, engraving machine models, stripper plates, chucks, etc.



CERROBASE

(Melting Temp., 255° F.)
For reproducing master patterns, models for electro-forming, engraving machine models, proof casting for forging dies, etc. Perfect reproduction of intricate detail.



CERROBEND

(Melting Temp., 158° F.)
Used as a filler in bending thin-walled tubes to small radii—easily removed in boiling water. Also used for templates in forming dies and for other purposes.

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Scrap

... MARKET ACTIVITIES AND QUOTATION TRENDS

The most drastic action taken with respect to prices since the First World War period by a governmental authority is the notice served on the iron and steel scrap trade by the price stabilization division of the National Defense Advisory Commission, as of Tuesday, Jan. 7, that No. 1 heavy melting steel shall be reduced to a price "not to exceed \$20 per ton at Pittsburgh" by voluntary action of the trade. In the event that this is not done, the commission stated that steps looking toward price control will be recommended.

Up until Monday of this week scrap prices were advancing rapidly in virtually all areas of the country. By Tuesday, however, the upward trend had apparently been checked. At the hour at which THE IRON AGE went to press there had been no transactions on which lower quotations could be based, and consequently the figures shown for all scrap grades this week reflect the tendencies of the past week.

Assuming that the price of No. 1 heavy melting steel at Pittsburgh is arbitrarily reduced to \$20, there are many complications affecting this grade at other points and all grades at every point that will not be easy to work out. Under the price fixing method which prevailed in 1917-18, a system of differentials as between districts and between grades was worked out. Possibly some such method will have to apply in the present instance. For example the price of No. 1 heavy melting steel as quoted this week for Pittsburgh is \$3 a ton above the Chicago average price and \$2.25 above the Philadelphia price. THE IRON AGE scrap composite this week is \$22, up 17c. over last week. Events clearly foreshadow a decline next week.

Pittsburgh

As of Tuesday this week practically all scrap transactions were at a standstill owing to reports emanating from Washington that current scrap prices were several dollars too high and that an effort would be made to cause a reduction of scrap prices on the basis of an ultimate goal of \$20 a ton for No. 1 heavy melting steel at Pittsburgh. However, during the past week and previous to the Washington pronouncements the market was excep-

tionally strong with No. 1 heavy melting steel quotable at \$23.50 to \$24, up 25c. from last week's average and railroad heavy melting steel stronger at \$24.50 to \$25 a ton. What effect the Washington discussions on scrap will have this week remains to be seen. Previous to Tuesday of this week brokers were experiencing great difficulty in picking up No. 1 heavy melting and were paying prices ranging from \$23.25 to \$23.75 a ton.

Philadelphia

Principally on the basis of broker purchases, steel-making grades stiffened further in the past week. No. 1 heavy melting was quoted at a flat \$21.50, while No. 2 steel was up 50c. to \$20.50. Old bundles, cast iron car-wheels, heavy breakable cast, and rail-

... Scrap quotations presented on page 93 represent the situation as it existed at noon on Tuesday, Jan. 7. Prices became nominal upon issuance of the National Defense Commission's statement demanding price reductions.

road malleable were up 50c., and No. 1 cupola and heavy axle turnings increased \$1. Machine shop turnings were sold at \$16 to \$16.50, and shafting was quoted at \$26 flat. The flow of shipments continues unimpeded to all district mills. The reopening of the Pencoyd plant of the American Bridge Co. about Feb. 1 will create a new market for steel scrap in this district. It is reported that this consumer has bought about 40,000 tons of Nos. 1 and 2 heavy melting steel, cast grades, flashings, bundles and turnings.

Chicago

In the light of governmental activities the early part of the week, dealers, brokers and consumers are following a "watch and wait" policy. The natural result is that prices have not moved either way. No. 1 heavy melting steel remaining at the quotation of \$20.50 to \$21.

Youngstown

No. 1 heavy melting scrap and allied grades are quoted up 50c. a ton here this week to a range of \$24 to \$24.50, on the basis of activity late last week.

Cleveland

The market is stronger this week, the current rise of 50c. a ton on No. 1 heavy melting to a range of \$23 to \$23.50 being slightly below what mills are asked to pay. Steel on one of the principal railroad's lists brought around \$24.50 for shipment to a number of points. In line with custom, purchases for spring delivery by water from upper lake ports are beginning.

Buffalo

On the basis of sales into consumption, No. 1 and No. 2 heavy melting steel are up \$1 here to ranges of \$23 to \$23.50 and \$21 to \$21.50, respectively. Sales of No. 1 machinery cast are reported in the range of \$22 to \$22.50, up \$1 from last week. All other scrap items are quoted 50c. higher this week. There is no evidence yet of any shortages of scrap in this area.

St. Louis

With dealers attending the convention of the Institute of Scrap Iron and Steel in Baltimore, the St. Louis scrap iron market marked time. There were no sales, and prices were unchanged.

Cincinnati

Further strength of the district old materials market is reflected in another increase of 25c. a ton in the entire list.

Birmingham

The market here continues strong, and, while scrap is coming into the district in increased volume, it is being shipped out about as soon as received. Heavy demand for all grades by steel mills, foundries and pipe shops is undiminished.

Detroit

Holiday and weekend interruptions and the absence of many important brokers and dealers for the scrap industry meeting makes it difficult to determine exactly the level of the market for the current week. There has been a scramble for all grades of material and reports that hydraulic compressed sheets were sold by one automotive producer into consumption at a figure nearly \$1 a ton above present quotations.

New York

Scrap is very strong and prices on most items are \$1 higher than last week. These increases for both steel and cast grades are due to very strong consumer demand. While dealers are hoping that the scrap conference in Washington will have a stabilizing influence, prices, it is said, had to be advanced to draw into the market a quantity sufficient to take care of current requirements. Small suppliers seem to be reluctant to dispose of material.

Boston

Sales of textile and machinery cast at \$24 a ton delivered, up \$2 a ton, concern small tonnages to slow pay buyers and therefore do not truly represent a real market. However, average prices for such material are \$1 a ton higher, as are those for stove plate, chemical borings and steel turnings. Advances of 25c. a ton or more have been made in prices for other usually active materials.

IRON AND STEEL SCRAP PRICES

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$23.50 to \$24.00
Railroad heavy mltng.	24.50 to 25.00
No. 2 heavy melting	22.00 to 22.50
Railroad scrap rails	24.50 to 25.00
Rails 2 ft. and under	27.50 to 28.00
Comp. sheet steel	23.50 to 24.00
Hand bundled sheets	22.50 to 23.00
Heavy steel axle turn	21.50 to 22.00
Heavy steel forge turn	20.50 to 21.00
Machine shop turnings	16.50 to 17.00
Short Shov. Turn. Alloy	17.00 to 17.50
Free	16.00 to 16.50
Mixed bor. & turn	16.00 to 16.50
Cast iron borings	16.50 to 17.00
Cast iron carwheels	23.00 to 23.50
Heavy breakable cast	18.00 to 18.50
No. 1 cupola cast	22.50 to 23.00
RR. knuckles & coup.	27.50 to 28.00
Rail coil springs	28.00 to 28.50
Rail leaf springs	28.00 to 28.50
Rolled steel wheels	28.00 to 28.50
Low phos. billet crops	28.50 to 29.00
Low phos. punchings	27.50 to 28.00
Low phos. heavy plate	26.00 to 26.50
Railroad malleable	26.50 to 27.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$21.50
No. 2 hvy. mltng. steel	20.50
Hydraulic bund., new	21.50
Hydraulic bund., old	18.50 to 19.00
Steel rails for rolling	25.00 to 26.00
Cast iron carwheels	23.50 to 24.00
Hvy. breakable cast	22.50 to 23.00
No. 1 cupola cast	24.50 to 25.00
Mixed yard (f'd'y) cast	21.00 to 21.50
Stove plate (steel wks.)	19.50 to 20.00
Railroad malleable	23.50 to 24.00
Machine shop turn	16.00 to 16.50
No. 1 blast furnace	15.00 to 15.50
Cast borings	16.50 to 17.00
Heavy axle turnings	20.50 to 21.00
No. 1 low phos. hvy.	26.00 to 26.50
Couplers & knuckles	26.00 to 26.50
Rolled steel wheels	26.00 to 26.50
Steel axles	25.00 to 25.50
Shafting	26.00
Spec. iron & steel pipe	18.00 to 18.50
Cast borings (chem.)	16.00

CHICAGO

Delivered to Chicago district consumers:

Per Gross Ton	
Hvy. mltng. steel	\$20.50 to \$21.00
Auto. hvy. mltng. steel	
alloy free	19.50 to 20.00
No. 2 auto steel	17.00 to 17.50
Shoveling steel	20.25 to 20.75
Factory bundles	20.00 to 20.50
Dealers' bundles	18.50 to 19.00
No. 1 busheling	19.50 to 20.00
No. 2 busheling, old	11.50 to 12.00
Rolled carwheels	24.25 to 24.75
Railroad tires, cut	24.00 to 24.50
Railroad leaf springs	23.50 to 24.00
Steel coup. & knuckles	23.50 to 24.00
Axle turnings	19.75 to 20.25
Coil springs	25.50 to 26.00
Axle turn. (elec.)	20.25 to 20.75
Los phos. punchings	23.50 to 24.00
Low phos. plates 12 in.	
and under	24.00 to 24.50
Cast iron borings	14.50 to 15.00
Short shov. turn	15.00 to 15.50
Machine shop turn	14.75 to 15.25
Rerolling rails	24.50 to 25.00
Steel rails under 3 ft.	24.50 to 25.00
Steel rails under 2 ft.	25.00 to 25.50
Angle bars steel	23.75 to 24.25
Cast iron carwheels	21.50 to 22.00
Railroad malleable	24.25 to 24.75
Agric. malleable	18.75 to 19.25

Per Net Ton

Iron car axles	\$24.50 to \$25.00
Steel car axles	25.50 to 26.00
Locomotive tires	18.75 to 19.25
Pipes and flues	14.50 to 15.00
No. 1 machinery cast	19.00 to 19.50
Clean auto. blocks	18.50 to 19.00
No. 1 railroad cast	18.00 to 18.50
No. 1 agric. cast	16.50 to 17.00
Stove plate	13.50 to 14.00
Grate bars	14.50 to 15.00
Brake shoes	14.50 to 15.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$24.00 to \$24.50
No. 2 hvy. mltng. steel	22.50 to 23.00
Low phos. plate	26.50 to 27.00
No. 1 busheling	23.00 to 23.50
Hydraulic bundles	23.50 to 24.00
Machine shop turn	15.00 to 15.50

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$23.00 to \$23.50
No. 2 hvy. mltng. steel	22.00 to 22.50

Comp. sheet steel	\$22.50 to \$23.00
Light bund. stampings	19.00 to 19.50
Drop forge flashings	21.25 to 21.75
Machine shop turn	14.50 to 15.00
Short shov. turn	15.00 to 15.50
No. 1 busheling	22.25 to 22.75
Steel axle turnings	22.50 to 23.00
Low phos. billet and bloom crops	27.50 to 28.00
Cast iron borings	15.50 to 16.00
Mixed bor. & turn	15.50 to 16.00
No. 2 busheling	15.50 to 16.00
No. 1 Machinery cast	24.00 to 24.50
Railroad cast	23.00 to 23.50
Railroad grate bars	17.00 to 17.50
Stove plate	17.00 to 17.50
Rails under 3 ft.	28.00 to 28.50
Rails for rolling	27.00 to 27.50
Railroad malleable	25.00 to 25.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$23.00 to \$23.50
No. 2 hvy. mltng. steel	21.00 to 21.50
Scrap rails	23.50 to 24.00
New hvy. b'ndled sheets	20.50 to 21.00
Old hydraulic bundles	19.00 to 19.50
Drop forge flashings	20.50 to 21.00
No. 1 busheling	20.50 to 21.00
Machine shop turn	15.00 to 15.50
Shov. turnings	16.00 to 16.50
Mixed bor. & turn	15.00 to 15.50
Cast iron borings	15.00 to 15.50
Knuckles & couplers	26.50 to 27.00
Coil & leaf springs	26.50 to 27.00
Rolled steel wheels	26.50 to 27.00
No. 1 machinery cast	22.00 to 22.50
No. 1 cupola cast	20.50 to 21.00
Stove plate	18.00 to 18.50
Steel rails under 3 ft.	27.00 to 27.50
Cast iron carwheels	20.00 to 21.00
Railroad malleable	25.00 to 25.50
Low phos. plate	28.00 to 28.50

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting	\$19.00 to \$19.50
No. 1 hvy. melting	18.75 to 19.25
No. 2 hvy. melting	18.00 to 18.50
No. 1 locomotive tires	21.50 to 22.00
Misc. stand. sec. rails	22.00 to 22.50
Railroad springs	23.50 to 24.00
Bundled sheets	14.50 to 15.00
Cast bor. & turn	11.50 to 12.00
Machine shop turn	12.00 to 12.50
Heavy turnings	14.50 to 15.00
Rails for rerolling	23.00 to 23.50
Steel car axles	26.00 to 26.50
No. 1 RR. wrought	16.00 to 16.50
No. 2 RR. wrought	17.50 to 18.00
Steel rails under 3 ft.	24.50 to 25.00
Steel angle bars	22.50 to 23.00
Cast iron carwheels	22.00 to 22.50
No. 1 machinery cast	21.00 to 21.50
Railroad malleable	22.50 to 23.00
Breakable cast	18.75 to 19.25
Stove plate	15.50 to 16.00
Grate bars	14.50 to 15.00
Brake shoes	15.50 to 16.00

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel	\$19.75 to \$20.25
No. 2 hvy. mltng. steel	17.75 to 18.25
Scrap rails for mltng.	24.75 to 25.25
Loose sheet clippings	14.25 to 14.75
Hyd'lic bundled sheets	18.50 to 19.00
Cast iron borings	10.75 to 11.25
Machine shop turn	11.50 to 12.00
No. 1 busheling	15.75 to 16.25
No. 2 busheling	9.25 to 9.75
Rails for rolling	26.00 to 26.50
No. 1 locomotive tires	21.75 to 22.25
Short rails	27.25 to 27.75
Cast iron carwheels	20.25 to 20.75
No. 1 machinery cast	23.25 to 23.75
No. 1 railroad cast	21.50 to 22.00
Burnt cast	14.25 to 14.75
Stove plate	14.25 to 14.75
Agricul. malleable	19.00 to 19.50
Railroad malleable	22.00 to 22.50
Mixed hvy. cast	20.25 to 20.75

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting steel	\$19.00
No. 2 hvy. melting steel	18.00
No. 1 busheling	17.00
Scrap steel rails	19.00
Steel rails under 3 ft.	21.00
Rails for rolling	20.00
Long turnings	9.50
Cast iron borings	8.50
Stove plate	12.50
Steel axles	19.00
No. 1 RR. wrought	17.00
No. 1 cast	19.00
No. 2 cast	14.00
Cast iron carwheels	20.00
Steel carwheels	19.00

DETROIT

Dealers' buying prices per gross ton, f.o.b. cars:

No. 1 heavy melting	\$18.00 to \$18.50
No. 2 heavy melting	17.00 to 17.50
Borings and turnings	13.00 to 13.50
Machine shop turnings	12.75 to 13.25
Long turnings	10.50 to 11.00
Short shov. turnings	13.50 to 14.00
No. 1 cast	20.00 to 20.50
Automotive cast	20.00 to 20.50
Hvy. breakable cast	16.50 to 17.00
Stove plate	12.00 to 12.50
Hydraulic comp. sheets	20.50 to 21.00
New busheling	18.00 to 18.50
Sheet clips	16.00 to 16.50
Flashings	18.00 to 18.50
Low phos. plate	21.00 to 21.50

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel	\$17.50 to \$18.00
No. 2 hvy. mltng. steel	16.50 to 17.00
Hvy. breakable cast	19.00 to 19.50
No. 1 machinery cast	19.50 to 20.00
No. 2 cast	17.50 to 18.00
Stove plate	15.50 to 16.00
Steel car axles	24.00 to 25.00
Shafting	20.50 to 21.00
No. 1 RR. wrought	18.50 to 19.00
No. 1 wrought long	18.00 to 18.50
Spec. iron & steel pipe	13.00 to 13.50
Rails for rolling	20.00 to 20.50
Clean steel turnings	11.50 to 12.00
Cast borings	12.00 to 12.50
No. 1 blast furnace	9.50 to 10.50
Cast borings (chem.)	11.50 to 12.00
Unprepared yard scrap	9.50 to 10.00
Light iron	6.50 to 7.00

Per gross ton delivered local foundries:

No. 1 machin. cast	\$22.00 to \$22.50
No. 2 cast	17.50 to 18.00

* \$1.50 less for truck loads.

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars:

Breakable cast	\$16.75 to \$17.00
Machine shop turn	11.25 to 11.50
Mixed bor. & turn	9.50 to 10.50
Bun. skeleton long	14.75 to 15.00
Shafting	19.75 to 20.00
Stove plate	14.50 to 14.75
Cast bor. chemical	11.00 to 11.50

Per gross ton delivered consumers' yards:

Textile cast	\$21.00 to \$22.00
No. 1 machine cast	21.00 to 22.00

Per gross ton delivered dealers' yards:

No. 1 hvy. mltng. steel	\$14.00
No. 2 steel	13.25

PACIFIC COAST

Per net ton delivered to consumer:

	San Fran.	Los Ang.	Seattle
No. 1 hvy. mltng. steel	\$14.25	\$13.25	\$15.00
No. 2 hvy. mltng. steel		12.00	
Bundles		10.00	

CANADA

Dealers' buying prices at these yards, per gross ton:

	Toronto	Montreal
Low phos. steel	\$13.00	\$12.50
No. 1 hvy. mltng. steel	11.25	10.75
No. 2 hvy. mltng. steel	10.00	9.75
Mixed dealers steel	8.75	8.25
Drop forge flashings	9.75	9.25
New loose clippings	8.75	8.25
Busheling	6.00	5.50
Scrap pipe	7.75	7.25
Steel turnings	7.50	7.00
Cast borings	7.50	7.00
Machinery cast	20.50	19.50
Dealers' cast	19.50	18.50
Stove plate	16.00	15.50

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered barges	
No. 1 hvy. mltng. steel	\$17.50 to \$18.00
No. 2 hvy. mltng. steel	16.50 to 17.00
No. 2 cast	17.50 to 18.00
Stove plate	15.50 to 16.00
Boston on cars at Army Base or Mystic Wharf	
No. 1 hvy. mltng. steel	\$17.25 to \$17.50
No. 2 hvy. mltng. steel	16.00
Rail (scrap)	17.50
Philadelphia, delivered alongside boats, Port Richmond	
No. 1 hvy. mltng. steel	Nominal
No. 2 hvy. mltng. steel	Nominal

Construction Steel

...STRUCTURAL STEEL, REINFORCING BARS, PLATES, PILING, ETC.

Fabricated Steel

Structural steel lettings drop to 33,900 tons from 44,260 tons last week; new projects higher at 48,500 tons; plate awards call for 1500 tons.

AWARDS

NORTH ATLANTIC STATES

- 3670 Tons, Brooklyn, Brooklyn Elevated Parkway, contract B9, to Bethlehem Steel Co., Bethlehem, Pa.
- 2000 Tons, Philadelphia, armor plate machine shop for Midvale Co., to Bethlehem Steel Co., Bethlehem, Pa.
- 550 Tons, Willowbrook, Staten Island, employees' buildings Nos. 32 and 33, to Harris Structural Steel Co., Plainfield, N. J.
- 500 Tons, Cornwell Heights, Pa., drum shop for Badenhoe Co. p., to Belmont Iron Works, Philadelphia.
- 450 Tons, Niagara Falls, N. Y., plant for E. I. du Pont de Nemours & Co., to Pittsburgh-Des Moines Steel Co., Pittsburgh.
- 325 Tons, Ambridge, Pa., extension to hot metal building for A. M. Byers & Co., to American Bridge Co., Pittsburgh.
- 200 Tons, Quonset Point, R. I., power house project 21, Naval base, to Harris Structural Steel Co., Plainfield, N. J.
- 200 Tons, Pottstown, Pa., building for Doehler Die Casting Co., to Bethlehem Steel Co., Bethlehem, Pa.
- 180 Tons, South Boston, dry dock shop, to American Bridge Co., Pittsburgh.
- 170 Tons, Chenango County, N. Y., County highway bridge, to American Bridge Co., Pittsburgh.
- 162 Tons, Staten Island, N. Y., warehouse for Procter & Gamble, to Ingalls Iron Works Co., Pittsburgh plant.
- 150 Tons, Rochester, N. Y., warehouse for Sears-Robuck & Co., to Bethlehem Steel Co., Bethlehem, Pa.
- 140 Tons, Melville, R. I., coaling station, to John E. Cox Co., Fall River, Mass.

THE SOUTH

- 5000 Tons, Louisville, Ky., ordnance shop, to American Bridge Co., Pittsburgh, through Westinghouse Electric & Mfg. Co.
- 513 Tons, Bastrop County, Tex., bridge work, to North Texas Iron & Steel Co., Fort Worth, Texas.

CENTRAL STATES

- 7200 Tons, Canton, Ohio, building for Westinghouse Electric & Mfg. Co., to Bethlehem Steel Co., Bethlehem, Pa.
- 3150 Tons, Winona, Minn., State bridges Nos. 5900 and 750, to American Bridge Co., Pittsburgh.
- 1600 Tons, Ravenna, Ohio, inert storage buildings for shell loading plant, to Pittsburgh-Des Moines Steel Co., Pittsburgh.
- 375 Tons, Trumbull County, Ohio, State project No. 336, to Bethlehem Steel Co., Bethlehem, Pa.

- 250 Tons, Lansing, Mich., S. S. Kresge Co., store, to Bethlehem Steel Co., Bethlehem, Pa.
- 208 Tons, State of Indiana, highway bridges, to Central States Bridge & Structural Co., Indianapolis.
- 150 Tons, Fairmont, Neb., State viaduct FAGH-143-G (3), to American Bridge Co., Pittsburgh.
- 130 Tons, Ravenna, Ohio, monorail support beams for government, to American Bridge Co., Pittsburgh.
- 100 Tons, Hamilton, Ohio, telephone exchange building, to Bethlehem Steel Co.

WESTERN STATES

- 5500 Tons, Ogden, Utah, Army warehouses at Hill Field (Invitation QM-6585-41-48), to Kansas City Structural Steel Co., Kansas City, Kan., through Al Johnson Construction Co. and James Leck Co., Minneapolis, contractors.
- 270 Tons, Los Angeles, warehouse at Mines Field, to Consolidated Steel Corp., Los Angeles, through Alco Construction Co., Los Angeles, contractor.
- 250 Tons, Burbank, Cal., Lockheed Aircraft building 146, to Pacific Iron & Steel Co., Los Angeles.
- 200 Tons, North Bend, Wash., bearing piles for three bridges on State Highway 2, to Bethlehem Steel Co., Seattle, through Neukirk Brothers, Seattle, contractors.
- 175 Tons, Ogden, Utah, equipment repair building at Hill Field (Invitation QM-6585-41-55), to Structural Steel & Forge Co., Salt Lake City.
- 100 Tons, Kushkokwim, Newcandle Landing, Alaska, Alaska Road Commission bridge, to Des Moines Steel Co., Des Moines, Iowa.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

- 2000 Tons, Buffalo, plant addition and 55 coke ovens for Donner-Hanna Coke Corp. Tonnage includes piling.
- 1800 Tons, War Department, Washington, six 200-ft. temporary hangars for Air Corps at various locations.
- 1600 Tons, Buffalo, Columbus, Ohio, and Robertson, Mo., boiler houses for Curtiss-Wright Corp.
- 525 Tons, Brooklyn, viaduct, stage 19, 11th Avenue, for New York Central Railroad Co.
- 500 Tons, Brooklyn, contract B-10, grade separation, for Triboro Bridge Authority.
- 500 Tons, Philadelphia, steel storage crane runway for Cramp Shipbuilding Corp.; bids Jan. 10.
- 350 Tons, New York, Harlem Savings Bank Building.
- 300 Tons, Bowmansville, N. Y., State highway bridge; bids Jan. 22.
- 275 Tons, Utica, N. Y., Mather Co. department store.
- 250 Tons, Philadelphia, reconditioning ship-building slips for Government.
- 230 Tons, Brooklyn, bridges, building and radio towers for Navy Department.
- 200 Tons, Westfield, Mass., factory building for Stevens Paper Mills.

- 165 Tons, Falmouth, Mass., Government ordnance shop at Camp Edwards.
- 110 Tons, Bridgeport, Conn., building for Remington Arms Co.
- 100 Tons, Lackawanna County, Pa., bridge; bids Jan. 14.

THE SOUTH

- 30,000 Tons, Charleston, W. Va., Naval ordnance plant.
- 800 Tons, Watts Bar Dam, Tenn., control building and power house for TVA.
- 800 Tons, Norfolk, Ark., Government dam project; bids Feb. 20.
- 170 Tons, State of Arkansas, two highway bridges; bids Jan. 8.

CENTRAL STATES

- 2272 Tons, Wilmington, Ill., light framing for Elwood ordnance plant.
- 1250 Tons, La Porte, Ind., 15 storage buildings for Government.
- 1148 Tons, Wilmington, Ill., heavy framing for Elwood ordnance plant.

WESTERN STATES

- 3000 Tons, Bonneville, Ore., to Oregon City, Ore., transmission towers for Bonneville Administration (Invitation 1617); bids taken.
- 125 Tons, Iris, Cal., railroad bridge over Coachella Canal (Specification No. 1461-D), for U. S. Bureau of Reclamation.

FABRICATED PLATES

AWARDS

- 1500 Tons, Baytown, Tex., welded tanks for Humble Oil Co., to Chicago Bridge & Iron Co., Chicago.

PENDING PROJECTS

- 6500 Tons, Coram, Cal., four penstocks for Shasta Dam (Specifications 941); Western Pipe & Steel Co., San Francisco, low bidder.
- 500 Tons, Pacific Coast, Navy mooring buoys (Schedule 4687); bids in.
- 150 Tons, Pacific Coast, Navy mooring buoys (Schedule 4531); bids in.
- 100 Tons, Canal Zone, gasoline storage tanks for contractor.

SHEET PILING

AWARDS

- 800 Tons, Bremerton, Wash., Navy Yard pier, to Bethlehem Steel Co., Seattle, through Puget Sound Bridge & Dredging Co. and Rumsey & Co., Seattle, contractors.
- 370 Tons, Kenosha, Wis., 1095-41-91, War Department, U. S. Engineer, to Inland Steel Co., Chicago.
- 221 Tons, Hawaiian Dredging Co., to Bethlehem Steel Co., San Francisco.
- 160 Tons, Seattle, Wash., bridges, inquiry S40, to Bethlehem Steel Co., Seattle, through Neukirk Bros.
- 102 Tons, San Francisco, Navy Schedule 2650, to Bethlehem Steel Co., San Francisco.

Weekly Bookings of Construction Steel

Week Ended —————→	Jan. 7,	Dec. 30,	Dec. 10,	Jan. 9,	Year to Date	
	1941	1940	1940	1940	1941	1940
Fabricated structural steel awards	33,900	44,260	18,800	10,625	33,900	10,625
Fabricated plate awards	1,500	1,535	815	420	1,500	420
Steel sheet piling awards	1,655	0	250	0	1,655	0
Reinforcing bar awards	14,045	8,620	10,700	9,700	14,045	9,700
Total Letting of Construction Steel	51,100	54,415	30,565	20,745	51,100	20,745

Reinforcing Steel

Awards of 22,665 tons; 25,280 tons in new projects including last week's figures.

AWARDS ATLANTIC STATES

- 1700 Tons, Philadelphia, warehouse for Marine Corps, to Bethlehem Steel Co., Bethlehem, Pa.
- 290 Tons, Camden, N. J., turret shop for New York Shipbuilding Corp., to Truscon Steel Co., Youngstown, through Leonard Shaffer, contractor.
- 150 Tons, Boston Navy Yard, light structural shop, to Concrete Steel Co., Boston, through Sawyer Construction Co., Boston, contractor.

SOUTH AND CENTRAL

- 6000 Tons, Burlington, Iowa, shell loading plant, to Paper-Calmenson & Co., St. Paul, Minn.
- 3500 Tons, LaPorte County, Ind., ammunition loading plant, to Bethlehem Steel Corp., Bethlehem, Pa.
- 3500 Tons, LaPorte County, Ind., ammunition loading plant, to Joseph T. Ryerson & Son, Inc., Chicago.
- 1000 Tons, Wilmington, Ill., ammunition loading plant, to Joseph T. Ryerson & Son, Inc., Chicago, Sanderson & Porter, contractors.
- 500 Tons, Louisville, Ky., Adair Street overpass, to Laclede Steel Co., St. Louis, through Ruby Lumber Co., contractor.
- 300 Tons, Barberton, Ohio, Norton housing, to Franklin Steel Co., Franklin, Pa., Weinstein Construction Co., contractor.
- 255 Tons, Ortega, Fla., State highway bridges, to Truscon Steel Co., Youngstown.
- 194 Tons, Summit County, Ohio, mesh for State project No. 330, to Bethlehem Steel Co., Bethlehem, Pa., through A. J. Baltes.
- 150 Tons, Minneapolis, building for Farmers & Mechanics Bank, to Truscon Steel Co., Youngstown, through Madsen Construction Co.
- 150 Tons, Jack County, Tex., State highway bridge work, to North Texas Iron & Steel Co., Fort Worth, Tex.
- 124 Tons, Lake Forest, Ill., hospital, to Joseph T. Ryerson & Son, Inc., Chicago.
- 111 Tons, St. Louis County, Mo., bridge, to Laclede Steel Co., St. Louis.
- 104 Tons, Bastrop County, Tex., bridge work, to North Texas Iron & Steel Co., Fort Worth, Tex.
- 100 Tons, Cincinnati, Ohio, Cincinnati Milling Machine Co., to Truscon Steel Co., Youngstown, through Austin Co., Cleveland.
- 100 Tons, Roanoke, Va., roadway material yard for N. & W. Railway, to Truscon Steel Co., Youngstown.
- 100 Tons, East LaPorte, N. C., expansion for Natchala Power & Light Co., to Truscon Steel Co., Youngstown.
- 100 Tons, Chicago, Jackson Park post office, to Calumet Steel Co., Chicago Heights, Ill.
- 100 Tons, Muncie, Ind., flood wall, to Truscon Steel Co., Youngstown.

WESTERN STATES

- 2300 Tons, San Pedro, Cal., Navy fleet operating base, to Consolidated Steel Corp., Los Angeles, through Guy F. Atkinson and George Pollock, contractors.
- 550 Tons, Fresno, Delano and Kingsbury, Cal., buildings for Wine Growers' Association, to Truscon Steel Co., Youngstown, through Cahill Bros.
- 400 to 600 Tons, Long Beach, Cal., Douglas Aircraft plant, to Blue Diamond Corp., Los Angeles.
- 400 Tons, San Francisco, warehouse and factory, to Truscon Steel Co., Youngstown, through Cahill Brothers, contractors.
- 172 Tons, Camp San Luis, Cal., sewage treatment plant, to Truscon Steel Co., Youngstown, through L. E. Dixon Co., contractor.
- 115 Tons, Ogden, Utah, engine test building at Hill Field, to Colorado Builders Supply Co., Denver, through Mead & Mount Construction Co., Denver, contractor.

CANAL ZONE

- 100 Tons, Panama Canal schedule No. 4596, to Sheffield Steel Corp., Kansas City.

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

- 300 Tons, Brockton, Mass., highway commission; bids January.
- 300 Tons, Brooklyn, procurement division invitation QMSO 626-41-282; bids in.
- 145 Tons, Providence, R. I., War Department supplies.
- 144 Tons, Port Judith, R. I., invitation 699-41-140 U. S. Engineer; bids Jan. 7.
- 110 Tons, Scranton, Pa., Lackawanna Avenue bridge.

SOUTH AND CENTRAL

- 15,000 Tons, Martin County, Ind., ammunition dump, Maxon Construction Co., contractor.
- 5000 Tons, Portage County, Ohio, ordnance storage depot, Hunkin-Conkey, contractor.
- 1800 Tons, Norfolk, Ark., Government dam project; bids Feb. 20.
- 500 Tons, Cairo, Ill., housing project; Henke Construction Co., Chicago, low bidder on general contract.
- 335 Tons, Giles County, Va., highway project No. 1166.
- 270 Tons, Muskingum County, Ohio, State project No. 333; Bellefontaine Development Co. low bidder.
- 226 Tons, Clark and Green Counties, Ohio, State project; Hinton & Smalley low bidders.
- 200 Tons, Marion County, Ind., highway bridge No. 2093.
- 180 Tons, Jeffersonville, Ind., warehouse, U. S. Engineers.
- 125 Tons, Cuyahoga County, Ohio, State project; National Engineering & Contracting Co., general contractor.
- 120 Tons, Trumbull County, Ohio, State project 336; Lombardo Brothers, Cleveland, general contractor.
- 109 Tons, Tuscarawas County, Ohio, State project; John Hill, low bidder.
- 100 Tons, East Chicago, Ind., Sinclair Refining Co.

WESTERN STATES

- 401 Tons, Coram, Cal., Shasta power plant (Invitation A-33,109-A-1); Columbia Steel Co., San Francisco, low bidder on general contract.
- 187 Tons, Earp Cal., Parker power plant (Invitation A-44,225-A); bids Jan. 8.
- 125 Tons, Camp Clayton, Cal., military buildings; Morrison-Knudsen Co., and Ford J. Twaits, Los Angeles, contractors.
- 100 Tons, Burbank, Cal., Lockheed Aircraft building No. 146.

Pipe Lines

Davis & Co., Inc., Commerce Building, Houston, Tex., oil operator, has approved plans for new 8-in. welded steel pipe line from oil field at Rincon, Starr County, Tex., to Brownsville, Tex., about 120 miles, for crude oil transmission to proposed oil refinery at latter place. Main pumping station will be built in Rincon field, with other booster stations along route. Line will have initial capacity of about 15,000 bbl. per day, to be increased later to approximately 25,000 bbl. by construction of a second pumping plant about 50 miles from terminus. Cost close to \$1,000,000. Bids for construction are being asked.

Gulfshore Oil Co., Corpus Christi, Tex., plans steel pipe lines in oil field district at Alice, Tex., for crude oil transmission. Cost about \$85,000.

Tide Water Associated Oil Co., Pacific Electric Building, Los Angeles, has awarded contract to Engineers, Ltd., 225 Bush Street, San Francisco, for new 8 $\frac{3}{4}$ -in. welded steel pipe line from main pipe line in Aliso Canyon, near Los Angeles, to Richfield line, about 23,000 ft., for crude oil transmission.

Phillips Petroleum Co., Bartlesville, Okla., has approved plans for new 4-in. welded steel pipe line from oil field at Hobart, Okla., to

tank farm at line of Rock Island Railroad, near Komalty, Okla., about nine miles, for crude oil transmission. Work will be carried out by company forces.

Pomona, Cal., has low bid from American Pipe & Steel Corp., 230 Date Avenue, Alhambra, Cal., for fusion fabricated steel pipe, 3/16-in. wall, for extensions in municipal water system, at unit prices per ft. as follows: 6400 ft. of 16-in., inside diameter, \$1.35; 2700 ft., 14-in. of inside diameter, \$1.07; 1400 ft. of 12-in., inside diameter, 89 cents; 1400 ft. of 10-in. inside diameter, 78 cents, and 1800 ft. of 8-in. inside diameter, 71 cents.

Peninsular Oil & Refining Co., Wallace Building, Tampa, Fla., plans pipe line gathering system and other pressure service in connection with development of oil properties in Collier County, Fla., where company has taken options on about 1,000,000 acres for exploration and development. Company is a subsidiary of Humble Oil & Refining Co., Humble Building, Houston, Tex.

Bureau of Reclamation, Denver, has awarded 4 to 20-in. pipe for South Ogden, Utah, distribution system (Specification 1458-D), to R. Hardesty Mfg. Co., Denver.

McMinnville, Ore., will take bids Jan. 8 on about 53,200 ft. of pipe to replace Haskins Creek pipe line. Under Plan A, 16-in. steel pipe would be required for entire distance. Stevens & Koon, Portland, Ore., are consulting engineers.

Cast Iron Pipe

Livingston, Wis., plans pipe lines for water system and other waterworks installation. Cost close to \$49,000. Financing has been arranged through Federal aid.

Knoxville, Iowa, plans new call soon for bids for pipe line extensions in water system and other waterworks installation, comprising about 32,500 ft. of 12-in. for main supply line, concrete reservoir, meter chamber and equipment, distribution lines, etc. Cost estimated at \$140,000. Foth & Boyd, Architects' Building, Green Bay, Wis., are consulting engineers.

Kirkwood, Mo., plans pipe line extensions and replacements in water system. Cost about \$35,000. Bond issue in that amount is being arranged. J. P. Sparks, 137 South Kirkwood Road, is consulting engineer.

Elwood, Ill., plans pipe lines for water system and other waterworks installation. Cost about \$35,000. Suhr, Berryman, Peterson & Suhr, Inc., 130 North Wells Street, Chicago, is engineer.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until Jan. 13 for 3000 ft. of 10-in. cement-lined cast iron water pipe, and 200 ft. of 6-in. cast iron water pipe (Circular 1344).

J. B. McCrary Co., Atlanta, Ga., consulting engineer, is at head of project to install pipe lines and other waterworks equipment for water system in Chattanooga Valley district, Ga., to be carried out under Georgia Revenue Certificate Act. Water supply will be secured from City Water Co., Chattanooga, Tenn., with connection with company system at St. Elmo, Tenn. Cost about \$100,000. Financing has been arranged through Federal aid.

Iron Mountain, Mich., plans pipe line extensions in water system in Ruell and Stridde districts, including elevated steel tank on steel tower. Cost about \$50,000. Federal Engineering Co., Central Office Building, Davenport, Iowa, is consulting engineer.

Modesto, Cal., plans about 4560 ft. of 8, 6 and 4-in. cement-lined cast iron pipe for extensions in water system. City engineering department is in charge.

Sacramento, Cal., has awarded 163 tons of 6 and 8-in. pipe to American Cast Iron Pipe Co., San Francisco.

Spokane, Wash., asks bids Jan. 9 on 925 tons of 4 to 12-in. pipe.

Prices of Finished Iron and Steel...

Steel prices on these pages are f.o.b. basing points (in cents per lb.) unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point ↓ Product	DELIVERED TO												Detroit	New York	Philadelphia
	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars			
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled ¹	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	
Long ternes ²	3.80¢		3.80¢									4.55¢			
Wrought iron	4.75¢														
STRIP															
Hot rolled ³	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢		
Cold rolled ⁴	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)					2.90¢		
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢								
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester = 3.35¢)					3.05¢		
TIN PLATE															
Standard cokes (Per 100-lb. base box)	\$5.00	\$5.00	\$5.00						\$5.10						
BLACK PLATE															
29 gage ⁵	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ (19)			
TERNES, M'FG.															
Special coated (Per base box)	\$4.30		\$4.30						\$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel ⁶	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (billet) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢		
Reinforcing (rail) ⁷	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢				2.40¢	2.45¢	2.15¢		
Cold finished ⁸	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢							2.70¢		
PLATES															
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Coatesville and Claymont = 2.10¢)		2.45¢	2.65¢		2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	
Alloy	3.50¢	3.50¢				(Coatesville = 3.50¢)									
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem = 2.10¢)			2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢				(Worcester = 3.00¢)							
0.51 to 0.75 Carbon	4.30¢			4.30¢				(Worcester = 4.50¢)							
0.76 to 1.00 Carbon	6.15¢			6.15¢				(Worcester = 6.35¢)							
1.01 to 1.25 Carbon	8.35¢			8.35¢				(Worcester = 8.55¢)							
WIRE⁹															
Bright	2.60¢	2.60¢		2.60¢	2.60¢			(Worcester = 2.70¢)							
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢			(Worcester = 2.70¢)							
Spring	3.20¢	3.20¢		3.20¢				(Worcester = 3.30¢)							
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			
IRON BARS															
Common		2.25¢				(Terre Haute, Ind. = 2.15¢)									
Refined	3.75¢														
Wrought	4.40¢														

¹ Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. ² Unassorted 8-lb. coating. ³ Widths up to 12 in. ⁴ Carbon 0.25 per cent and less. ⁵ Applies to 29 gage within certain width and length limitations. ⁶ For merchant trade. ⁷ Straight lengths as quoted by distributors. ⁸ Also shafting. For quantities of 20,000 to 39,999 lb. ⁹ Carload lots to manufacturing trade. ¹⁰ Boxed.

PRICES

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are \$2 higher f.o.b. Duluth, billets only, \$2 higher.

Per Gross Ton

Rerolling\$34.00
Forging quality 40.00

Shell Steel

Basic open hearth shell steel f.o.b. Pittsburgh and Chicago.

Per Gross Ton

3 in. to 12 in.....\$52.00
12 in. to 18 in..... 54.00
18 in. and over..... 56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity. This type of steel is for hot rolled sections used for the forging of shells and includes rounds, round squares, and special sections.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton

Open hearth or bessemer.....\$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved, universal and sheared. 1.90c.

Wire Rods

(No. 5 to 9/32 in.)

Per Lb.

Pittsburgh, Chicago, Cleveland. 2.00c.
Worcester, Mass. 2.10c.
Birmingham 2.00c.
San Francisco 2.50c.
Galveston 2.25c.
9/32 in. to 4/64 in., \$3 a net ton higher. Quantity extras apply.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh; Package, 112 Sheets)
20x14 in. 20x28 in.

8-lb. coating I.C..	\$6.00	\$12.00
15-lb. coating I.C..	7.00	14.00
20-lb. coating I.C..	7.50	15.00
25-lb. coating I.C..	8.00	16.00
30-lb. coating I.C..	8.63	17.25
40-lb. coating I.C..	9.75	19.50

WIRE PRODUCTS

(To the Trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

Base per Keg

Standard wire nails\$2.55
Coated nails 2.55
Cut nails, carloads 3.85

Base per 100 Lb.

Annealed fence wire\$3.05

Base Column

Woven wire fence* 67
Fence posts (carloads)..... 69
Single loop bale ties..... 56
Galvanized barbed wire†..... 70
Twisted barbless wire 70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:
½ in. and smaller by 6 in. and shorter68
9/16 and ¾ in. by 6 in. and shorter66
¾ to 1 in. by 6 in. and shorter.64
1½ in. and larger, all lengths..62
All diameters over 6 in. long..62
Lag, all sizes65

Plow bolts68½
Hot pressed nuts; c.p.c., t-nuts; square, hex., blank or tapped:
½ in. and smaller.....66
9/16 to 1 in. inclusive.....63
1½ in. to 1½ inclusive.....61
1½ in. and larger.....60

On above items, excepting plow bolts, additional allowance of 10 per cent for full container quantities.

On all of the above items there is an additional 5 per cent allowance for carload shipments.

Semi-fin. hexagon nuts U.S.S. S.A.E.

½ in. and smaller....	66	70
9/16 to 1 in.....	63	65
1½ in. through 1½ in..	61	62
1½ in. and larger....	60	..

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose

73 and 10

Stove bolts in packages, with nuts

attached73

Stove bolts in bulk.....81

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York, lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham\$3.40

Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham65 and 10

Cap and Set Screws

Per Cent Off List

Milled hexagon head, cap screws,
1 in. dia. and smaller..... 50
Milled headless set screws, cut
thread ¼ in. and larger..... 64
3/16 in. and smaller..... 73
Upset hex. head cap screws U.S.S.
or S.A.E. thread 1 in. and
smaller 68
Upset set screws, cup and oval
points 74
Milled studs 52

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

NON-FERROUS PRICES

Cents per lb. for early delivery

	Dec. 31	Jan. 2	Jan. 3	Jan. 4	Jan. 6	Jan. 7
Copper, Electrolytic¹	12.00	12.00	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00	12.00	12.00
Tin, Straits, New York..	50.10	50.10	50.10	..	50.10	50.10
Zinc, East St. Louis²	7.25	7.25	7.25	7.25	7.25	7.25
Lead, St. Louis³	5.35	5.35	5.35	5.35	5.35	5.35

¹Mine producers' quotations only, delivered Conn. Valley. Deduct ¼ c. for approximate New York delivery price. ²Add 0.39c. for New York delivery. ³Add 0.15c. for New York delivery.

Warehouse Products

Cents per lb., Delivered

Tin	New York	Cleveland
Straits pig	51.25	53.75
Copper		
Electro	12.75	13.50
Castings	12.50	13.00
H. R. Sheets*	20.12	20.12
Seamless tubes*	20.62	20.62
Brass		
Yellow sheets*	18.65	18.65
Yellow, rods*	13.67	13.67
Seamless tubes*	21.40	21.40
Zinc		
Slabs	Nom'al	Nom'al
Sheet, No. 9 casks..	13.50	Nom'al
Lead		
American pig	6.50	6.00
Bar	8.45	8.50
Cut sheets	8.80	8.75

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper		
Hvy. crucible	10.00	10.625
Hvy. and wire	9.00	9.40
Light and bottoms..	8.00	8.50
Brass		
Heavy	5.750	6.255
Light	4.750	5.50
No. 1 yel. turn.	5.50	6.50
No. 1 red or compo.	..	..
turnings	8.75	9.25
Hvy. Mach. compo..	9.00	9.375
Lead		
Heavy	4.50	5.00
Aluminum		
Cast	10.75	11.75
Sheet	13.75	14.75
Zinc	5.50	5.75

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cents plus, 17c.-18c. a lb.; No. 12 remelt No. 2, standard, 17.25-18c. a lb. NICKEL electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICK-SILVER, \$164-\$166 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 13.25c. a lb.

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33%; on brass sheets and rods, 40; on brass tubes, 33½, and copper tubes, 40.

PRICES

ALLOY STEEL

Alloy Steel Blooms, Billets and Slabs

Base per gross ton, f.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem.....\$54.00

Alloy Steel Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade 2.70c.
Delivered, Detroit 2.80c.

S.A.E. Alloy Differential,
Series per 100 Lb.
Numbers
2000 (1.5 Ni)\$0.35

2100 (1.5 Ni)	0.75
2300 (3.5 Ni)	1.70
2500 (5 Ni)	2.55
3100 Ni-Cr	0.70
3200 Ni-Cr	1.35
3300 Ni-Cr	3.80
3400 Ni-Cr	3.20
4100 Cr-Mo (0.15 to 0.25 Mo.)..	0.55
4100 Cr-Mo (0.25 to 0.40 Mo.)..	0.75
x4340 Cr-Ni-Mo	1.70
4340 Cr-Ni-Mo	1.85
4600 Ni-Mo (0.2-0.3 Mo, 1.5-2 Ni)	1.20
5100 (0.60-0.90 Cr)	0.35
5100 (0.80-1.10 Cr)	0.45
5100 Cr spring steel	0.15
52-100 Cr. (electric furnace)...	2.60
6100 Cr-V bar	1.20

6100 Cr-V spring steel	0.85
C-V	0.85

The above differentials are for hot rolled finished products. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. Delivered Detroit, 3.45c., carlots.

Alloy Steel Plates

Base per lb., f.o.b. Pittsburgh, Chicago and Coatesville.
Open hearth grade3.50c.

STAINLESS AND HEAT-RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chromium-Nickel

No.	304	302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium

No.	410	430	442	446
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
H'tstrip	17.00c.	17.50c.	24.00c.	35.00c.
C'd st.	22.00c.	22.50c.	32.00c.	52.00c.

TOOL STEEL

(F.o.b. Pittsburgh)

	Base per Lb
High speed	67c.
High-carbon-chromium	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

ELECTRICAL SHEETS

(F.o.b. Pittsburgh)

	Base per Lb
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago	\$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00

Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$45 at Birmingham and \$53.80 delivered Chicago.

Cincinnati

HERRINGBONE GEARED

HYPRO

OPENSIDE

PLANERS



When buying a modern planer check these features:

MAGNETIC DIAL FEEDS (Patented)

Individual for rail heads and side heads. Feeds selectable by 64ths from 1/64" to 1" with a twist of the wrist. Feeds may be changed at any position or direction of table travel. Heads may be fed at either end of table stroke.

STEEL TEE SLOT INSERTS (Patented)

Table Tee Slots are fitted with steel inserts so that lower edges will not be damaged by bolt heads. This construction prevents pulling out of tee slots insuring perfect condition of table throughout life of machine.

DOUBLE BRONZE NUTS

Used on all down feed and cross feed screws in all saddles and slides. This construction provides double life for all screw movements as all thrust and wear is taken by two nuts instead of one.

EXTENDED SADDLE AND HARP

To provide extra support for the slides along with an additional long-leverage bolt circle producing maximum rigidity between saddle and harp.

Examine the Hypro Openside Planer critically. Full particulars in our new Bulletin No. 110 sent free on written request.

PLANERS • PLANER MILLERS • BORING MILLS

THE CINCINNATI PLANER CO.

CINCINNATI, OHIO

PRICES

BOILER TUBES

Seamless Steel and Lap Weld Commercial
Boiler Tubes and Locomotive Tubes.
Minimum Wall

(Net base prices per 100 ft., f.o.b. Pitts-
burgh, in carload lots)

		Seamless	Lap
		Cold Drawn	Hot Rolled
		Hot Rolled	Hot Rolled
1 in. o.d. 13 B.W.G.	\$9.01	\$7.82	....
1 1/4 in. o.d. 13 B.W.G.	10.67	9.26	....
1 1/2 in. o.d. 13 B.W.G.	11.70	10.23	\$9.72
1 3/4 in. o.d. 13 B.W.G.	13.42	11.64	11.06
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2 1/4 in. o.d. 13 B.W.G.	16.76	14.54	13.79
2 1/2 in. o.d. 12 B.W.G.	18.45	16.01	15.16
2 3/4 in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	21.42	18.59	17.54
3 1/2 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3 1/2 in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66
4 1/2 in. o.d. 10 B.W.G.	43.04	37.35	35.22
5 in. o.d. 9 B.W.G.	54.01	46.87	44.25
6 in. o.d. 7 B.W.G.	82.93	71.96	68.14

Extras for less carload quantities:

40,000 lb. or ft. over.....	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.....	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District
and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought iron
pipe)

Base Price=\$200 Per Net Ton

Butt Weld

Steel	Black	Galv.
1/8 in.	56	36
1/4 to 3/8 in.	59	43 1/2
1/2 in.	63 1/2	54
3/4 in.	66 1/2	58
1 to 3 in.	68 1/2	60 1/2

Wrought Iron

	Black	Galv.
1/4 and 3/8 in.	+9	+10
1/2 in.	24	6 1/2
3/4 in.	30	13
1 and 1 1/4 in.	34	19
1 1/2 in.	38	21 1/2
2 in.	37 1/2	21

Lap Weld

Steel		
2 in.	61	52 1/2
2 1/2 and 3 in.	64	55 1/2
3 1/2 to 6 in.	66	57 1/4
7 and 8 in.	65	55 1/2
9 and 10 in.	64 1/2	55
11 and 12 in.	63 1/2	54

Wrought Iron

2 in.	30 1/2	15
2 1/2 to 3 1/2 in.	31 1/2	17 1/2
4 in.	33 1/2	21
4 1/2 to 8 in.	32 1/2	20
9 to 12 in.	28 1/2	15

Butt weld, extra strong, plain ends

Steel	Black	Galv.
1/8 in.	54 1/2	41 1/2
1/4 to 3/8 in.	56 1/2	45 1/2
1/2 in.	61 1/2	53 1/2
3/4 in.	65 1/2	57 1/2
1 to 3 in.	67	60

Wrought Iron

1/4 and 3/8 in.	+10	+43
1/2 in.	25	9
3/4 in.	31	15
1 to 2 in.	38	22 1/2

Lap weld, extra strong, plain ends

Steel		
2 in.	59	51 1/2
2 1/2 and 3 in.	63	55 1/2
3 1/2 to 6 in.	66 1/2	59

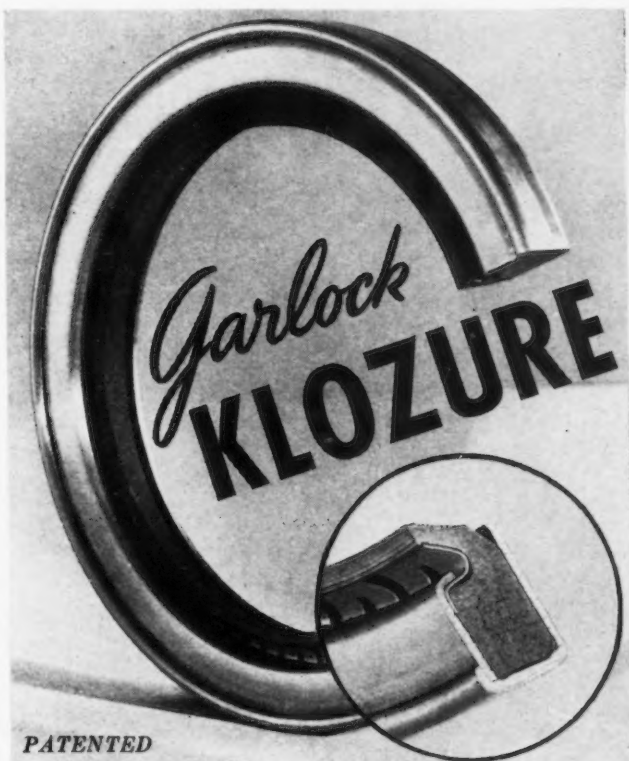
	Black	Galv.
7 and 8 in.	65 1/2	56
9 and 10 in.	64 1/2	55
11 and 12 in.	63 1/2	54

Wrought Iron

2 in.	33 1/2	18 1/2
2 1/2 to 4 in.	39	25 1/2
4 1/2 to 6 in.	37 1/2	24
7 and 8 in.	38 1/2	24 1/2
9 to 12 in.	32	20 1/2

On butt weld and lap weld steel pipe
jobbers are granted a discount of 5%. On
less-than-carload shipments prices are de-
termined by adding 25 and 30% and the
carload freight rate to the base card.

F.o.b. Gary prices are two points lower
discount or \$4 a ton higher than Pitts-
burgh or Lorain on lap weld and one
point lower discount, or \$2 a ton higher,
on all butt weld 8 in. and smaller.



**RESISTS
OIL
AND
HEAT**

OIL and heat are destructive enemies of the ordinary oil seal! But the Garlock KLOZURE, because it's made with an *exclusive* Garlock compound, *resists* these enemies—*stands up* month after month without losing its toughness, density and resiliency. The Garlock KLOZURE is furnished in a complete range of sizes. Write for booklet.



SPLIT-KLOZURE

To meet the need for an Oil Seal that can be installed around the shaft, rather than over the end of the shaft, Garlock has developed the new, patented SPLIT-KLOZURE. For all shafts of 3" diameter and larger. Write for special catalog.

THE GARLOCK PACKING COMPANY

PALMYRA, NEW YORK

In Canada:

The Garlock Pack-
ing Company of
Canada Ltd., Mon-
treal, Que.



PRICES

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, bessemer, 51.50%..	\$4.75
Old range, non-bessemer, 51.50%	4.60
Mesaba, bessemer, 51.50%.....	4.60
Mesaba, non-bessemer, 51.50%..	4.45
High phosphorus, 51.50%.....	4.35

Foreign Ores*

C.A.f. Philadelphia or Baltimore, Exclusive or Duty

Per Unit

Algerian, low P, Cu free, dry, 55 to 58% Fe	Nom.
---	------

Caucasian, washed, 52% Mn....	Nom.
African, Indian, 44 to 48% Mn....	50c.
African, Indian, 49 to 51% Mn....	54c.
Brazilian, 46 to 48% Mn.....	50c.
Cuban, del'd, duty free, 51% Mn..	68c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered	\$23 to \$24
Tungsten, domestic scheelite, delivered	\$23.00
Chrome ore, lump c.i.f. Atlantic Seaboard, per gross ton: South African (low grade)	Nom.
Rhodesian, 45%	\$23.50
Rhodesian, 48%	27.50

RAILS, TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., gross ton	\$40.00
Angle bars, 100 lb.....	2.70

F.o.b. Basing Points

Light rails (from billets), gross ton	\$40.00
Light rails (from rail steel), gross ton	39.00

Base per Lb.

Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast	2.30c.
Track bolts, steam railroads...	4.15c.
Track bolts, discount to jobbers all sizes (per 100 counts)...	65-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneapqua, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va.

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail.....	\$20.00 to \$21.00
Domestic, f.o.b. Ohio River landing barges	20.00 to 21.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines..	20.00 to 21.00
Foreign, 85% calcium fluoride, not over 5% Si., c.i.f. Atlantic ports, duty paid.....	Nominal
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines....	31.00
As above, in bags, f.o.b. same mines	32.60

REFRACTORIES

Fire Clay Brick

Per 1000 f.o.b. Works

Super-duty brick at St. Louis..	\$60.80
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey....	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	42.75
Second quality, New Jersey....	49.00
No. 1 Ohio	39.90
Ground fire clay, per ton.....	7.10

Silica Brick

Pennsylvania	\$47.50
Chicago District	55.10
Birmingham	47.50
Silica cement, net ton (Eastern)	8.55

Chrome Brick

Net per Ton

Standard f.o.b. Baltimore, Plymouth Meeting and Chester...	\$50.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	50.00

Magnesite Brick

Standard f.o.b. Baltimore and Chester	\$72.00
Chemically Bonded, f.o.b. Baltimore	61.00

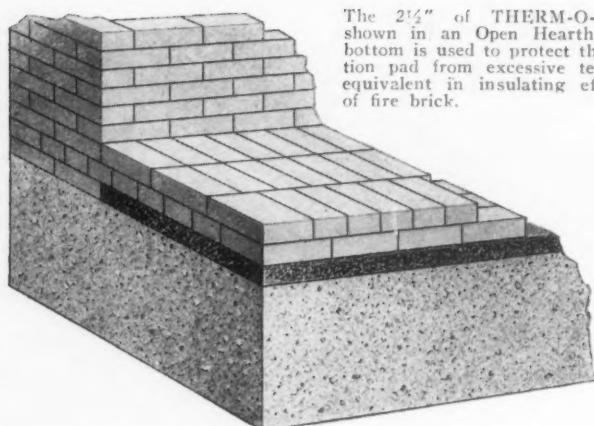
Grain Magnesite

Imported, f.o.b. Baltimore and Chester, Pa. (in sacks).....	(—)*
Domestic, f.o.b. Baltimore and Chester in sacks	\$40.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

*None available.

Therm-O-flake INSULATING CONCRETE

A Light Weight High Temperature Concrete with
Double Insulating Value



The 2½" of THERM-O-FLAKE Concrete shown in an Open Hearth checker chamber bottom is used to protect the concrete foundation pad from excessive temperatures. It is equivalent in insulating effect to about 15" of fire brick.

Reduces usual insulating concrete thickness by about half.

Increases effective depths of flues and checkers in Open Hearth furnace construction.

Protects concrete foundation pads from excessive heat.

Allows increased magnesite thickness in Open Hearth bottoms.

Smooths surface irregularities on Open Hearth bottom pans.

Write for Information and Prices

Other **Therm-O-flake** Products

Made from Exfoliated Vermiculite

Granules - Coating - Brick - Block



JOLIET, ILL.

PRICES

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload).....\$120.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....\$36.00

Domestic, 26 to 28%..... 49.50

Electric Ferrosilicon

Per Gross Ton, Delivered, Lump Size

50% (carload lots, bulk).....\$74.50*

50% (ton lots, packed)..... 87.00*

75% (carload lots, bulk).....135.00*

75% (ton lots, packed).....151.00*

Bessemer Ferrosilicon

Per Gross Ton, F.o.b. Jackson, Ohio

10.00 to 10.50%.....\$34.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2% \$1 per ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton, F.o.b. Jackson, Ohio

5.00 to 5.50%.....\$28.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots Lump Size, on Contract

4 to 6% carbon.....11.00c.

2% carbon17.50c.

1% carbon18.50c.

0.10% carbon20.50c.

0.06% carbon21.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon\$113.00*

2.50% carbon 118.00*

2% carbon 123.00*

1% carbon 133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del. carload..... \$2.00

Ferrotungsten, 100 lb. and less 2.25

Ferrovandium, contract, per lb. contained V, del'd \$2.70 to \$2.90†

Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., ton lots \$2.25†

Ferrocobaltititanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace, carload and contract, per net ton.....\$142.50

Ferrocobaltititanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton.....\$157.50

*Spot prices are \$5 per ton higher.

†Spot prices are 10c. per lb. of contained element higher.

Ferrophosphorus, electric or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton 58.50

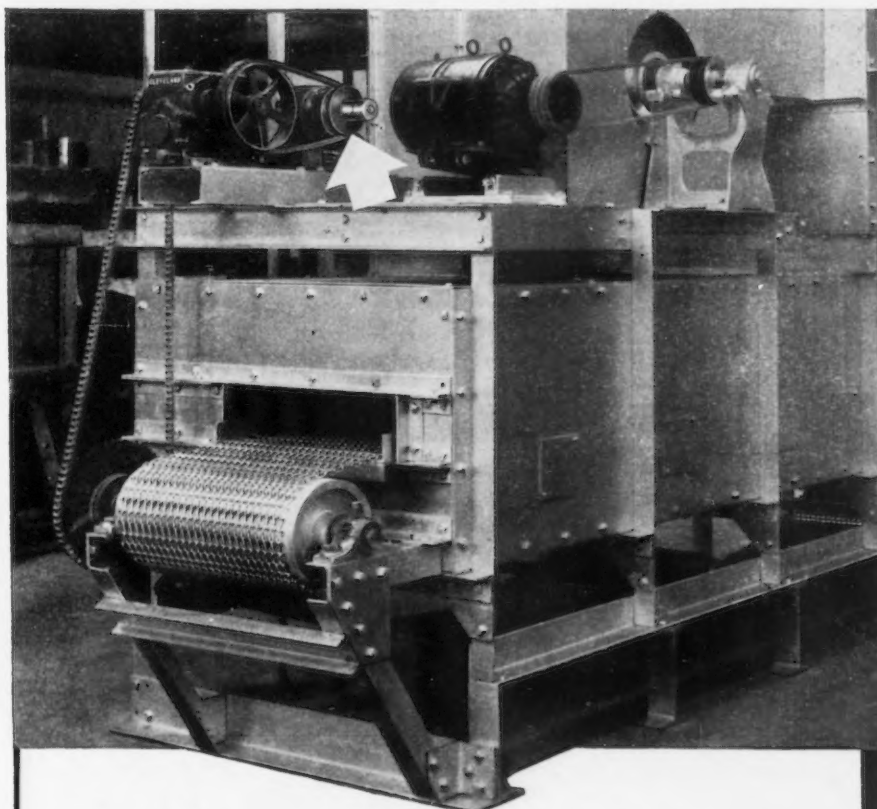
Ferrophosphorus, electrolytic 23-26% in carlots, f.o.b. Monsato (Siglo), Tenn., 24%, per gross tons, \$3 unitage, freight equalized with Nashville 75.00

Ferromolybdenum, per lb. Mo, f.o.b. furnace 95c.

Calcium molybdate, per lb. Mo, f.o.b. furnace 80c.
Molybdenum oxide briquettes 48-52% Mo, per lb. contained Mo, f.o.b. Langeloth, Pa. 80c.

FUEL OIL

No. 3, f.o.b. Bayonne, N. J.....4.50c.
No. 6, f.o.b. Bayonne, N. J.....2.98c.
No. 5 Bur. Stds., del'd Chicago..3.25c.
No. 6 Bur. Stds., del'd Chicago..2.75c.
No. 3 distillate, del'd Cleveland..5.50c.
No. 4 industrial, del'd Cleveland.5.00c.
No. 5 industrial, del'd Cleveland 4.75c.
No. 6 industrial, del'd Cleveland.4.50c.



FAST or SLOW . . . at the Operator's "Say So" with REEVES SPEED CONTROL

● The operator knows, better than the machine, which speed is best for the job at hand. That is why the Industrial Heating Equipment Company furnace, like more than 1,321 other industrial machines, is equipped with REEVES Speed Control. Simply by turning a hand-wheel the operators of these machines have all the "say so," and can regulate machine speeds to fractional r.p.m.'s for exact timing of processes, for perfect synchronization. REEVES units—Transmissions, Vari-Speed Motor Pulleys, Motodrives—are easily and inexpensively applied to machines in service. Catalog G-397 pictures and describes scores of process-improving installations. It's free. Write for it.

REEVES PULLEY COMPANY, Dept. I, COLUMBUS, INDIANA

PRICES

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, prompt	\$5.25 to \$5.75
Foundry, f.o.b. Connellsville, prompt	\$5.50 to \$6.00
F'dry, by-product, Chicago.....	10.50
F'dry, by-product, New England	13.00
Foundry, by-product, Newark or Jersey City	\$11.30 to \$11.90
F'dry, by-product, Philadelphia.	11.13
F'dry, by-product, Cleveland...	11.55
F'dry, by-product, Cincinnati...	11.00
Foundry, Birmingham	7.50
F'dry, by-product, St. Louis	
	\$10.75 to \$11.00
Foundry, from Birmingham, f.o.b. cars dock Pacific ports.....	\$14.75

BRITISH

British

Per Gross Ton, f.o.b. United Kingdom Ports

Ferromanganese, export.£17	18s.
Tin plate, per base box. 32s. to 33s.	
Steel bars, open hearth.£13	9s.
Beams, open hearth....£12	2s. 6d.
Channels, open hearth..£12	2s. 6d.
Angles, open hearth....£12	2s. 6d.
Black sheets, No. 24, gage £18 17s. 6d. max.*; £18 17s. 6d. min.**	
Galvanized sheets, No. 24 gage £19 10s. max.*; £19 10s. min.**	

*Empire markets only.

**Other than Empire markets.

PIG IRON (Per Gross Ton)

Prices delivered various consuming points indicated by bold italics

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phos.
Boston	\$25.50	\$25.00	\$26.50	\$26.00	.....
Brooklyn	27.50	.....	.....	28.00	.....
Jersey City	26.53	26.03	27.53	27.03	.....
Philadelphia	25.84	25.34	26.84	26.34	.....
Bethlehem, Pa.	\$25.00	\$24.50	\$26.00	\$25.50	.....
Everett, Mass.	25.00	24.50	26.00	25.50	.....
Swedeland, Pa.	25.00	24.50	26.00	25.50	.....
Steelton, Pa. ....	.....	24.50	.....	.....	28.50
Birdsboro, Pa.	25.00	24.50	26.00	25.50	28.50
Sparrows Point, Md.	25.00	24.50	.....	.....	.....
Erie, Pa.	24.00	23.50	25.00	24.50	.....
Neville Island, Pa.	24.00	23.50	24.50	24.00	.....
Sharpville, Pa.††....	24.00	23.50	24.50	24.00	.....
Buffalo	24.00	23.00	25.00	24.50	28.50
Cincinnati	24.44	24.61	.....	25.11	.....
Canton, Ohio	25.39	24.89	25.89	25.39	.....
Mansfield, Ohio	25.94	25.44	26.44	25.94	.....
St. Louis	24.50	24.02	.....	.....	.....
Chicago	24.00	23.50	24.50	24.00	.....
Granite City, Ill.	24.00	23.50	24.50	24.00	.....
Cleveland	24.00	23.50	24.50	24.00	.....
Hamilton, Ohio	24.00	23.50	.....	24.00	.....
Toledo	24.00	23.50	24.50	24.00	.....
Youngstown††	24.00	23.50	24.50	24.00	.....
Detroit	24.00	23.50	24.50	24.00	.....
St. Paul	26.63	.....	27.13	26.63	.....
Duluth	24.50	.....	25.00	24.50	.....
Birmingham	19.38*	18.00	24.00	.....	.....
Los Angeles, San Francisco and Seattle....	27.50	.....	.....	.....	.....
Provo, Utah	22.00	.....	.....	.....	.....
Montreal†	27.50	27.50	.....	28.00	.....
Toronto†	25.50	25.50	.....	26.00	.....

GRAY FORGE

Valley or Pittsburgh fce.....\$24.50

CHARCOAL

Lake Superior fce.....\$27.00
Delivered Chicago 30.34

Base prices are subject to an additional charge for delivery within the switching limits of the respective districts.

*Delivered prices on Southern iron for shipment to Northern points are 38c. a ton below delivered prices from nearest Northern basing point on iron with phosphorus content of 0.70 per cent and over. †On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

WAREHOUSE PRICES

(Base Prices, Dollars per 100 lb., Delivered Metropolitan Areas)

	Pitts- burgh	Chicago	Cleve- land	Phila- delphia	New York	Detroit	Buffalo	Boston	Birm- ingham	St. Louis	St. Paul	Mil- waukee	Los Angeles
Sheets, hot rolled	\$3.15	\$3.05	\$3.15	\$3.55	\$3.58	\$3.23	\$3.05	\$3.51	\$3.45	\$3.19	\$3.30	\$3.48	\$4.30
Sheets, cold rolled .....	.....	4.10	4.05	4.05	4.40	4.30	4.30	4.58	.....	4.12	4.35	4.43	6.50
Sheets, galvanized	4.75	4.60	4.42	4.90	5.00	4.64	4.60	5.11	4.75	4.95	4.75	4.98	5.25
Strip, hot rolled	3.40	3.40	3.30	3.95	3.96	3.48*	3.62	3.86	3.70	3.54	3.65	3.73	.....
Strip, cold rolled	3.20	3.30	3.20	3.31	3.51	3.20	3.22	3.26	.....	3.41	3.83	3.54	.....
Plates	3.40	3.55	3.40	3.55	3.76	3.60	3.62	3.85	3.35	3.47	3.80	3.68	4.00
Structural shapes	3.40	3.55	3.58	3.55	3.75	3.65	3.40	3.85	3.55	3.69	3.80	3.68	4.15
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.64	3.75	3.63	4.15
Bars, cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300.	7.20	7.10	7.55	7.31	7.35	7.42	7.35	7.50	.....	7.47	7.45	7.33	9.40
Bars, ht. rld. SAE 3100.	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	.....	6.02	6.00	5.88	8.55
Bars, cd. drn. SAE 2300.	8.15	8.15	8.15	8.56	8.59	8.45	8.40	8.63	.....	8.52	8.84	8.38	10.65
Bars, cd. drn. SAE 3100.	6.75	6.75	6.75	7.16	7.19	7.05	6.75	7.23	.....	7.12	7.44	6.98	9.80

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb.; galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb.; galvanized sheets, 450 to 1499 lb.; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb.; galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb.; galvanized sheets, 500 to 1499 lb.; Milwaukee, cold rolled sheets, 400 to 1499 lb.; galvanized sheets, 150 to 499 lb.; New York, hot rolled sheets, 0 to 1999 lb.; cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, shapes, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 150 to 1049 lb. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier. \$3.23.

Sales Possibilities

... CONSTRUCTION, PLANT EXPANSION AND EQUIPMENT BUYING

North Atlantic States

• **American Tube Bending Co.**, 5 Lawrence Street, New Haven, Conn., aluminum, brass, steel and other metal tubing and bends, plans one-story addition, 100 x 120 ft. Cost over \$85,000 with equipment. Douglas Orr, 96 Grove Street, is architect.

Wyman-Gordon Co., 105 Madison Street, Worcester, Mass., forgings for automotive and other service, has let general contract to E. J. Cross Co., 150 Prescott Street, for one-story addition, 120 x 360 ft., for storage and distribution. Cost close to \$100,000 with equipment.

Ordnance Department, Springfield Armory, Springfield, Mass., has taken over section of one-story building recently completed, about 115,000 sq. ft. of floor space, for new division for production of semi-automatic rifles, including parts manufacture and assembling.

Todd-Bath Iron Shipbuilding Corp., South Portland, Me., recently organized interest of Todd Shipyards Corp., 1 Broadway, New York, and Bath Iron Works Corp., Bath, Me., has taken over tract of local waterfront property for new shipyard, including shipways, one-story shops, boiler house and other structures, for construction of steel freighters for British Government. Cost over \$2,500,000.

General Electric Co., Pittsfield, Mass., has begun erection of one-story addition, 75 x 175 ft., for which general contract recently was let to Lindholm Construction Co., 1277 East Street, for expansion in transformer-manufacturing division. Cost close to \$175,000 with equipment. Another award has been made to same contractor for addition to power plant, to cost about \$100,000 including equipment.

Greenfield Tap & Die Corp., Greenfield, Mass., has contracted with National Defense Advisory Commission, Washington, for plant expansion for production of precision gages for War Department, including one and two-story additions and installation of new equipment. Cost about \$1,000,000. General contract will be let soon for a two-story extension, 82 x 215 ft., to plant No. 1, Meridian Street, McClintock & Craig, 458 Bridge Street, Springfield, Mass., are consulting engineers.

Continental Can Co., 100 East Forty-second Street, New York, has let general contract to Austin Co., Los Angeles, for two-story addition, 140 x 200 ft., to branch plant at 3820 Union Pacific Avenue, Los Angeles. Cost close to \$200,000 with equipment. Company engineering department, 111 West Washington Street, Chicago, is in charge.

General Electric Co., Schenectady, N. Y., has asked bids on general contract for one and two-story addition, 240 x 560 ft. Cost over \$750,000 with equipment. Albert Kahn Associated Architects & Engineers, Inc., Detroit, is architect and engineer.

Rheem Mfg. Co., 30 Rockefeller Plaza, New York, steel drums and other steel containers, plans expansion at branch plant at Houston, Tex., used for production of steel barrels and drums for export gasoline, lubricants, etc. Work will include buildings and equipment to double present capacity. Cost over \$250,000.

Liberty Aircraft Products Corp., Farmingdale, L. I., N. Y., aircraft parts and equipment, plans one-story additions for production of equipment for Navy Department, which has arranged fund of \$1,088,000 for buildings and machinery.

Delehanty Institute, 115 East Fifteenth Street, New York, has leased about 17,000 sq. ft. in building at 37-41 East Eighteenth Street for new vocational school.

Air Reduction Sales Co., Inc., 60 East Forty-second Street, New York, has let general contract to E. C. Machin Co., Commonwealth Building, Allentown, Pa., for new one-story plant at Bethlehem, Pa. Cost about \$75,000 with equipment.

Rane Tool Co., Ross Street, Jamestown, N. Y., tools, jigs, etc., plans one-story addition. Cost close to \$50,000 with equipment.

Allegheny Ludlum Steel Corp., Dunkirk, N. Y., plans two one-story additions for expansion in machine shop and wire works respectively to cost over \$150,000 with equipment. Main offices are in Oliver Building, Pittsburgh. This is part of general expansion program at different mills. Entire project will cost about \$2,000,000.

Eclipse Machine Division, Bendix Aviation Corp., Eighteenth Street and Oakwood Avenue, Elmira, N. Y., coaster brakes and parts, hose couplings, etc., has let general contract to Henry W. Streeter Corp., 608 William Street, for one-story addition, 400 x 400 ft. Cost over \$450,000 with equipment.

Central New York Power Corp., 300 Erie Boulevard West, Syracuse, N. Y., is arranging fund of about \$900,000 through bond and stock issue, for expansion and improvements, and working capital, part of appropriation to be used for construction of new artificial gas plant at Syracuse.

Taylor Wine Co., Hammondsport, N. Y., plans one-story addition for storage and distribution. Cost close to \$50,000 with equipment. Wiard & Martin, 315 Alexander Street, Rochester, N. Y., are architects.

Walter Kidde & Co., Inc., 60 West Street, Bloomfield, N. J., fire extinguishers and systems, etc., has acquired about 30 acres at Washington Avenue and line of Erie Railroad, Belleville, N. J., for two-story and basement plant for production of aircraft equipment for Government. Erection will be carried out by Walter Kidde Constructors, Inc., 140 Cedar Street, New York, associated interest. Cost close to \$1,000,000, of which about \$750,000 will represent equipment purchases. With this development company has abandoned plans for expansion at Bloomfield plant previously announced. J. Floyd Yewell, 10 East Fortieth Street, New York, is architect.

Devonsheer Melba Corp., 8 Thirteenth Street, West New York, N. J., baker, plans rebuilding one-story plant at Fifty-seventh Street and Boulevard East, recently destroyed by fire. Loss over \$60,000 with traveling ovens, conveyors and other equipment.

Krueger Brewing Co., 75 Belmont Avenue, Newark, N. J., plans one-story building on Orange Street, 190 x 200 ft., for storage, distribution and allied service. Cost close to \$100,000 with equipment.

Edgcomb Steel Co., D Street and Erie Avenue, Philadelphia, has purchased five-acre tract at Hillside Avenue and Lehigh Valley Railroad, Hillside, N. J., for new one-story storage and distributing plant, about 50 x 400 ft., with two-story portion for office. Cost about \$100,000 with equipment. Agreement with Township Committee provides for plant erection on or before April 1, 1941. Company is operating branch plant at 350 Frelinghuysen Avenue, Newark.

New York Shipbuilding Corp., Camden, N. J., has let general contract to Leonard Schaefer Co., 1310 Spruce Street, Philadelphia, for two-story shop addition, 35 x 110 ft. Cost over \$100,000 with equipment. Sydney Jelinek, Philadelphia address noted, is architect.

Standard Pressed Steel Co., Stewart Avenue, Jenkintown, Pa., steel shop equipment, trucks and other steel products, has let general contract to Townsend, Schroeder & Wood, Inc., 1700 Sansom Street, Philadelphia, for two one-story additions, 75 x 140 ft., and

75 x 120 ft. Cost over \$100,000 with equipment. Widdicombe Engineering Co., Philadelphia address noted, is engineer.

Sun Shipbuilding & Dry Dock Co., Chester, Pa., has acquired tract adjoining plant, including about 945 ft. of water frontage on Delaware River, for expansion, to include four additional shipways, wet basin, shops and other structures. Work will be carried out with appropriation of \$2,500,000 authorized by Navy Department, Washington.

Payne Coal Co., Exeter, Pa., lessee, and Lehigh Valley Coal Co., Wilkes-Barre, Pa., owner, plan rebuilding coal breaker and boiler plant at first noted place, recently destroyed by fire. Loss over \$200,000 with equipment.

Trojan Powder Co., Inc., Allentown, Pa., has arranged with War Department for construction and operation of new mill for production of TNT, near Sandusky, Ohio, where large tract is being acquired. Plant will comprise one-story units, with machine shop, power house and other structures. Cost about \$11,000,000, for which financing will be provided by Government.

Westinghouse Electric & Mfg. Co., East Pittsburgh, has let general contract to Robert E. Lamb Co., 843 North Nineteenth Street, Philadelphia, for one-story addition, 80 x 500 ft., to branch plant at Lester, near Philadelphia, used for production of turbines, parts and other heavy equipment. Cost over \$500,000 with equipment.

General American Transportation Corp., Sharon, Pa., tank cars, castings, etc., is arranging for purchase of adjoining plant of Petroleum Iron Works Co., for expansion, with exception of steel barrel and drum division. Main offices are at 135 South LaSalle Street, Chicago.

Division of Purchases and Sales, Department of Commerce, Washington, asks bids until Jan. 13 for high-speed steel side milling cutters (Circular 30929).

National Brewing Co., Conkling and O'Donnell Streets, Baltimore, has let general contract to Davis Construction Co., 9 West Chase Street, for one-story addition for storage and distribution. Cost close to \$45,000 with equipment. P. W. Backus is company engineer.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 16 for magnet wire (Schedule 4680) for Brooklyn and Mare Island Navy yards; self-tapping sheet metal screws (Schedule 4678) for Sewall's Point, Va., and San Diego yards; galvanized iron or steel wire rope clips (Schedule 4677) for Brooklyn, Philadelphia, Sewall's Point and Western yards; until Jan. 14 for dummy car trucks (Schedule 4630) for Eastern and Western yards.

The South

• **E. I. du Pont de Nemours & Co., Inc.**, Chemical Department, du Pont Building, Wilmington, Del., will begin construction of new plant near Morgantown, W. Va., for production of synthetic ammonia for Government. It will include machine and mechanical shops, power house and other structures. Award has been made to Boso & Ritchie Co., Ravenswood, W. Va., for grading of site. Project will be carried out in cooperation with War Department, which will provide fund of about \$15,000,000 for plant.

Morse-Rogers Steel Co., 1515 Fairfield Avenue, Cleveland, steel specialties, tubular steel furniture, etc., has acquired former property of Boatwright Furniture Co., Danville, Va., and will remodel for branch metal furniture plant. Present furniture division at 12401 Euclid Avenue, Cleveland, will be removed to new location and capacity increased.

City Council, Sumter, S. C., has approved plans for new steel hangar, 80 x 100 ft., at municipal airport, with extension, 45 x 50 ft., for machine and reconditioning shop. Cost close to \$75,000 with equipment.

Pine Bluff School of Aviation, Pine Bluff, Ark., recently organized by W. R. Kent, Memphis, Tenn., and associates, has let contract to Wessell Construction Co., Memphis, for new aviation school at municipal airport, Pine Bluff. It will comprise 10 or more one-story shops and other mechanical and operating buildings. Cost about \$150,000 with equipment. Later further expansion will be made in school buildings and facilities to cost approximately \$60,000.

Gulf Shipbuilding Corp., Mobile, Ala., has work under way on modernization and improvements in former Chickasaw shipyard, to include new shops and other structures, with installation of cranes and other equipment. Entire project will cost about \$3,000,000. Plant will be used for construction of vessels for Government.

Procter & Gamble Defense Corp., recently organized subsidiary of Procter & Gamble Co., Cincinnati, has contracted with War Department on cost-plus-fixed-fee basis for new ammunition loading plant at Milan, Tenn., where Government is acquiring tract. Plant will consist of one and multi-story production units, with machine and mechanical shops, power house, pumping station and other structures. Cost about \$14,000,000.

American Brewing Co., 717 Bienville Street, New Orleans, has asked bids on general contract for one-story addition for expansion in cooling division and other departments. Cost about \$45,000 with equipment. Sam Stone, Jr., & Co., Masonic Temple Building, are architects.

Ferris-Hall Body & Trailer Co., 6414 Harrisburg Boulevard, Houston, Tex., automobile bodies, trailers, parts, etc., plans new two-story plant, 50 x 150 ft., at Portwood Street and Navigation Boulevard. Cost close to \$70,000 with equipment.

McEvoy Co., 600 Milby Street, Houston, Tex., oil well equipment, parts, etc., has leased part of Kelso-Vetrano Building, Hutcheson Street, for production of portable tripod machine gun mounts for War Department, for which company has contract.

City Council, Sonora, Tex., plans new municipal power plant. Cost about \$175,000 with equipment. Special election has been called Jan. 11 to vote bonds in that amount. Albert C. Moore & Co., Smith-Young Tower Building, San Antonio, Tex., are consulting engineers.

Central States

• **Lake Erie Steel & Blanking Co.**, 221 East 121st Street, Cleveland, steel products, has asked bids on general contract for two-story addition, 60 x 142 ft., for expansion in production. Cost close to \$100,000 with equipment. Edward W. Hoefler, 5005 Euclid Avenue, is engineer.

Alpha Portland Cement Co., Easton, Pa., plans expansion and improvements in branch mill at Ironton, Ohio, including kilns and other production facilities. Cost over \$200,000 with equipment.

Lima Locomotive Works, Inc., Lima, Ohio, industrial locomotives, shovels, cranes, etc., has let general contract to James Stewart Corp., 343 South Dearborn Street, Chicago, for one-story addition. Cost over \$500,000 with equipment.

Springfield Aluminum Plate & Castings Co., 1524 South Yellow Springs Road, Springfield, Ohio, has approved plans for two one-story additions, for expansion in furnace department for melting aluminum ingots, and extensions in storage and distribution division. Cost over \$60,000 with furnace units, blowers and other equipment.

Ohio Edison Co., Springfield, Ohio, plans addition to Gorge steam-electric generating station, including new turbine-generator unit and accessories, high-pressure boilers and auxiliary equipment. Cost estimated close to \$3,500,000.

Fischer Bakery, 3021 Colerain Avenue, Cincinnati, has asked bids on general contract for

new one-story plant, 140 x 385 ft., at St. Bernard. Cost over \$100,000 with traveling ovens, conveyors, mixing machinery and other equipment. J. R. Biedinger, 2234 Highland Avenue, is consulting engineer.

Peerless Foundry Co., 1853 Ludlow Street, Indianapolis, gray iron castings, has begun erection of two-story addition, 40 x 81 ft., for expansion in foundry. W. C. LeFeber, 3709 North Emerson Avenue, is general contractor. Cost over \$45,000 with equipment. V. C. Bower, 5930 Guilford Avenue, is engineer.

Curtiss-Wright Corp., Propeller Division, 30 Rockefeller Plaza, New York, and Caldwell, N. J., has acquired for new branch plant property on West Washington Street, Indianapolis, formerly used for automobile manufacture by Marmon Co., consisting of three main units on 14-acre tract, five stories, 600 x 800 ft.; one-story, 100 x 800 ft., and smaller structure.

War Department, Washington, has let general contract to Walbridge-Aldinger Co., Griswold Building, Detroit, and Foley Brothers, Inc., New York Building, St. Paul, Minn., for small arms ammunition plant at Lake City, Mo. It will be operated by Remington Arms Co., Inc., Bridgeport, Conn., which will supervise erection. Cost about \$18,000,000, to be financed by Government. Smith, Hinchman & Grylls, Inc., Marquette Building, Detroit, is consulting engineer.

Paraseal Corp., St. Louis, recently organized by R. S. Weiner, St. Louis, and associates to manufacture electrical products, has acquired building at 4215 Clayton Avenue, with adjoining tract, for new plant.

Chrysler Motor Parts Corp., Funston and Chrysler Roads, Kansas City, Kan., an interest of Chrysler Corp., has leased one-story adjoining building, about 87,500 sq. ft. floor space, to be erected by Kansas City Industrial Land Co., Railway Exchange Building, for which bids have been asked on general contract. Cost over \$200,000 with equipment. Charles E. Keyser, 609 Minnesota Avenue, is architect.

Hayes Mfg. Corp., Grand Rapids, Mich., automobile bodies and other automotive equipment, has arranged for sale of stock to total about \$625,000, of which approximately \$210,000 will be used for plant extensions and improvements. Of last noted sum about \$150,000 will be expended for additional equipment.

Ford Motor Co., Dearborn, Mich., has let general contract to Esslinger-Milch Co., 159 East Columbia Street, Detroit, for two-story addition, 360 x 1000 ft., at River Rouge plant, for aircraft engine production. Cost over \$1,250,000 with equipment. Giffels & Vallet, Inc., Marquette Building, Detroit, is architect and engineer.

Bower Roller Bearing Co., 3040 Hart Street, Detroit, has let general contract to Austin Co., Cleveland, for one-story addition. Cost about \$75,000 with equipment.

Austin-Western Road Machinery Co., 601 North Farnsworth Avenue, Aurora, Ill., road-building machinery and other heavy equipment, has let general contract to Algott B. Larson & Co., 3837 West Lake Street, Chicago, for one-story addition, 70 x 300 ft. Cost close to \$250,000 with equipment. E. O. Sessions & Co., 120 South LaSalle Street, Chicago, are consulting engineers.

Foote Brothers Gear & Machine Corp., 5301 South Western Avenue, Chicago, has taken over building of Central Steel & Wire Co., 4545 South Western Avenue, recently purchased, about 125,000 sq. ft. of floor space, for production of gears and devices for aircraft engines. Present plant will be continued at first noted address.

Ampeo Metal, Inc., 3830 West Burnham Street, Milwaukee, parts for airplane engines, propellers, etc., has let general contract to Keierleber Construction Co., 2249 North Forty-eighth Street, for two-story addition, 150 x 300 ft. Cost over \$175,000 with equipment.

Commanding Officer, Naval Reserve Base, Sixtieth Street and Thirty-fourth Avenue South, Minneapolis, has secured appropriation of \$1,006,000 for new buildings, to include steel hangar, about 200 x 200 ft., with two-story wing extension for machine and reconditioning shop, one-story structure for munition storage and distribution, power plant and other

buildings. About \$100,000 will be expended for equipment for hangar.

Hamilton Mfg. Co., Two Rivers, Wis., steel furniture for industrial plants and offices, has let general contract to Immel-Mabie Co., 104 South Main Street, Fond du Lac, Wis., for one-story addition for storage and distribution. Cost about \$115,000 with equipment. W. Fred Dolke, 2204 Merchandise Mart, Chicago, is architect.

Danly Machine Specialties, Inc., 2104 South Fifty-second Avenue, Cicero, Ill., die-maker's equipment, die sets, dowel pins, etc., has let general contract to Kaiser-Ducett Co., 80 East Jackson Boulevard, for one-story addition, 350 x 640 ft. Cost over \$400,000 with equipment. Burnham & Hammond, 160 North LaSalle Street, are architects.

Western States

• **National Supply Co.**, 1524 Border Avenue, Torrance, Cal., oil well equipment and supplies, has let general contract to R. E. Payne, 7526 Crenshaw Boulevard, for three one-story additions, 40 x 160 ft., 40 x 125 ft., and 50 x 120 ft., for expansion in welding works and other departments, with smallest unit for general operating. Cost close to \$100,000 with equipment. Main offices are in Grant Building, Pittsburgh.

Todd-California Shipbuilding Corp., San Francisco, recently organized subsidiary of Todd Shipyards Corp., New York, has acquired about 100 acres in Parr Terminal district, San Francisco Bay, for new shipbuilding plant, including shipways, wet basin, machine and mechanical shops, and other structures. Cost over \$3,000,000. It will be used for production of steel freighters for British Government.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Jan. 15 for one 200-kw. gasoline engine-driven electric alternator, gasoline storage tank, switchgear, panel boards, piping, etc., for naval radio station, Mare Island Navy Yard (Specification 10070).

San Diego Gas & Electric Co., Electric Building, San Diego, Cal., plans new steam-electric generating plant, to be known as Silver Gate station, installation to include a 35,000-kw. turbine-generator unit, high-pressure boilers and auxiliary equipment. Company also will carry out expansion at main generating plant at Broadway and Kettner Boulevard, to increase capacity by 15,000-kw. Entire project will cost over \$3,000,000.

Puget Sound Sheet Metal Works, Inc., 3641 East Marginal Way, Seattle, has let general contract to Austin Co., Dexter-Horton Building, for two-story addition, 44 x 141 ft., for a tank assembling plant. Cost over \$75,000 with equipment. Richard E. Ellis, Dexter-Horton Building, is engineer.

Neu-Bart Stamping & Mfg. Co., 120 West Slauson Avenue, Los Angeles, metal stampings, has let general contract to Ted R. Cooper Co., Western Pacific Building, for one-story addition, 70 x 100 ft. Cost close to \$50,000 with equipment.

Canada

• **Way Sagless Spring Co., Ltd.**, 48 Abell Street, Toronto, steel springs, has let general contract to Yolles & Rotenberg, Ltd., 372 Bay Street, for new one-story plant on South Kingsway. Cost about \$70,000 with equipment. Kaplan & Sprackman, 305 Dundas Street West, are architects.

Canadian Car & Foundry Co., Ltd., 621 Craig Street West, Montreal, plans one-story plant, about 125 x 250 ft., at Amherst, N. S., for assembling of airplanes. Cost over \$150,000 with machinery.

Maritime Steel & Foundries, Ltd., New Glasgow, N. S., steel castings, etc., plans two one-story additions for expansion in production department. Cost over \$85,000 with equipment.

Canada Cycle & Motor Co., Ltd., Dufferin Road, Weston, Ont., motor cycles, parts, etc., plans one-story addition. Cost close to \$50,000 with equipment. T. Pringle & Son, Ltd., 36 Toronto Street, Toronto, is architect.